

Keysight Wireless Connectivity Test Set

This help file provides documentation for the following products:

E6650A EXF Wireless Test Set for Femtocell

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V9077B WLAN
Measurement
Application User's &
Programmer's
Reference

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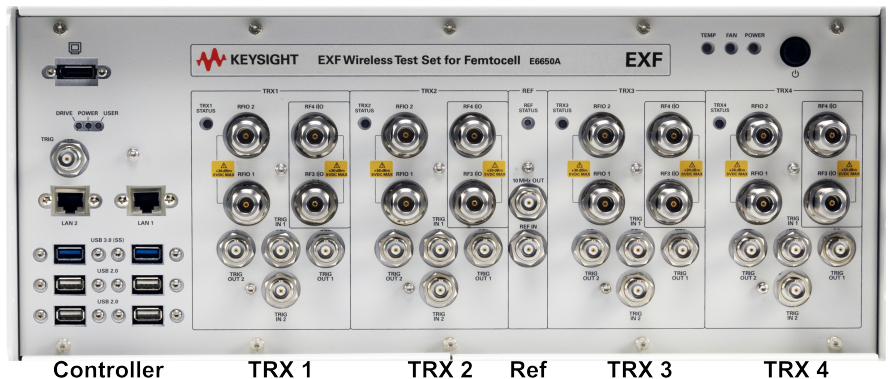
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1 About the Test Set

The X-Series E6650A EXF Wireless Test Set for Femtocell is a one-box tester consisting of instruments loaded into a M9018A PXI mainframe with a front impact cover. The mainframe has a common PC controller (located on the far left) and M9300A PXI Frequency Reference (located in the center of the rack). The test set has one to four Keysight M9440A TRX (transmit/receive) instruments installed.

Each TRX includes a signal analyzer and a signal source, both of which interface with the front panel of the test set through an input/output matrix, and is run by its own instance of the XSA firmware application (a fully loaded test set shows four independent XSA windows on its monitor display).

The E6650A can be configured to test cellular products with a standard 40 MHz of analysis bandwidth. It could also be configured to test Wireless products with 80 or 160 MHz of analysis bandwidth. If your requirement is to test both, the TRX instruments can be configured to test both products.



Installing Application Software

If you want to install a measurement application after your initial hardware purchase, you need only to license it. All of the available applications are loaded in your test set at the time of purchase.

Thus, when you purchase a new application, you will receive an entitlement certificate that you can use to obtain a license key for that application. To activate the new measurement application, enter the license key that you obtain into the test set.

For the latest information on Keysight X-series measurement applications and upgrade kits, visit the following internet URL.

<http://www.keysight.com/find/e6650a>

Viewing a License Key

Measurement applications that you purchased with your instrument have been installed and activated at the factory before shipment. The instrument requires a unique License Key for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, instrument model number and serial number. It enables you to install, or reactivate, that particular application.

Press **System, Show, System** to display the measurement applications that are currently licensed in your analyzer.

Go to the following location to view the license keys for the installed measurement applications:

```
C:\Program Files\Agilent\Licensing
```

You may want to keep a copy of your license key in a secure location. To do this, you can print out a copy of the display showing the license numbers. If you should lose your license key, call your nearest Keysight Technologies service or sales office for assistance.

Obtaining and Installing a License Key

If you purchase an additional application that requires installation, you will receive an "Entitlement Certificate", which may be redeemed for a license key for one instrument. To obtain your license key, follow the instructions that accompany the certificate.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you copy the license file to the USB memory device, at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the built-in license management application, which may be found via the instrument front panel keys at **System, Licensing. . .**, or on-disk at:

```
C:\Programming Files\Agilent\Licensing
```

You can also use these procedures to reinstall a license key that has been accidentally deleted, or lost due to a memory failure.

Updating Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This helps to ensure that you receive

any improvements and expanded functionality.

Because the software was loaded at the initial purchase, further additional measurement applications may now be available. If the application you are interested in licensing is not available, you will need to do a software update. (To display a list of installed applications, press **System, Show, System.**)

Check the appropriate page of the Keysight web site for the latest available software versions, according to the name of your instrument, as follows:

http://www.keysight.com/find/E6650A_software

You can load the updated software package into the analyzer either from a USB drive or directly from the internet. An automatic loading program is included with the files.

EXF Options and Accessories

You can view an online list of available Options and Accessories for your instrument as follows:

1. Browse to one of the following URLs, according to the product name of your analyzer:
www.keysight.com/find/e6650a
2. The home page for your instrument appears (in some cases, you may see an initial splash screen containing a button named View the Webpage, which you should click to display the home page).
3. Locate the **Options & Accessories** tab, as highlighted in the example below, which shows the home page for the E6650A.
4. Click the **Options & Accessories** tab, to display a list of available options and accessories for your instrument.

Front-Panel Features

The instrument Front-panel features are fully detailed in the section "Front-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

Latest available on line document: [E6650A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

Display Annotations

Display Annotations are fully detailed under the chapter "Front and Rear Panel Features" of the document:

Latest available on line document: [E6640A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the links above to open the PDF document.

Rear-Panel Features

The instrument's Rear-panel features are fully detailed in the section "Rear-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

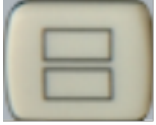
Latest available on line document: [E6650A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

Window Control Keys

Multi-Window



The **Multi Window** front-panel key will toggle you back and forth between the Normal View and the last Multi Window View (Zone Span, Trace Zoom or Spectrogram) that you were in, when using the Swept SA measurement of the Spectrum Analyzer Mode. It remembers which View you were in through a Preset. This “previous view” is set to Zone Span on a Restore Mode Defaults.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Zoom

Zoom is a toggle function. Pressing this key once increases the size of the selected window. Pressing the key again returns the window to the original size.

When Zoom is on for a window, that window will get the entire primary display area. The zoomed window, since it is the selected window, is outlined in green.

Zoom is local to each Measurement. Each Measurement remembers its Zoom state. The Zoom state of each Measurement is part of the Mode’s state.

NOTE

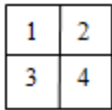
Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

| | |
|-----------------------------|---|
| Remote Command | :DISPlay:WINDow:FORMat:ZOOM |
| Remote Command | :DISPlay:WINDow:FORMat:TILE |
| Example | :DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed |
| Preset | TILE |
| Initial S/W Revision | Prior to A.02.00 |

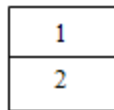
Next Window

Selects the next window of the current view. When the Next Window key is pressed, the next window in the order of precedence becomes selected. If the selected window was zoomed, the next window will also be zoomed.

The window numbers are as follows. Note that these numbers also determine the order of precedence (that is, Next Window goes from 1 to 2, then 2 to 3, etc.):



Four window display



Two window display

RTSA measurements:

Only two windows are available in the Spectrogram view under the Spectrum measurement and up to three windows are available in the Power vs. Time measurement, depending on the view set up.

| | |
|-----------------------|---|
| Remote Command | :DISPlay:WINDow[:SElect] <number> :DISPlay:WINDow[:SElect]? |
| Example | :DISP:WIND 1 |
| Preset | 1 |
| Min | 1 |
| Max | If <number> is greater than the number of windows, limit to <number of windows> |
| Initial S/W Revision | Prior to A.02.00 |

One and only one window is always selected. The selected window has the focus; this means that all window-specific key presses apply only to that window. You can tell which window is selected by the thick green border around it. If a window is not selected, its boundary is gray.

If a window in a multi-window display is zoomed it is still outlined in green. If there is only one window, the green outline is not used. This allows the user to distinguish between a zoomed window and a display with only one window.

The selected window is local to each Measurement. Each Measurement remembers which window is selected. The selected window for each Measurement is remembered in Mode state.

NOTE

When this key is pressed in Help Mode, it toggles focus between the table of contents window and the topic pane window.

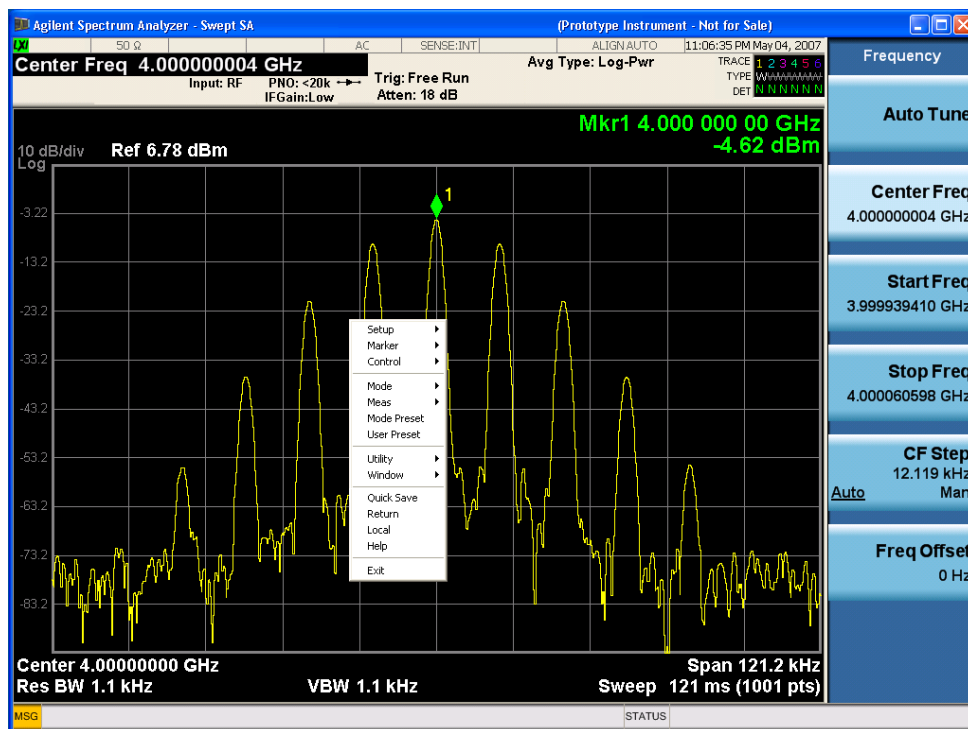
Mouse and Keyboard Control

If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

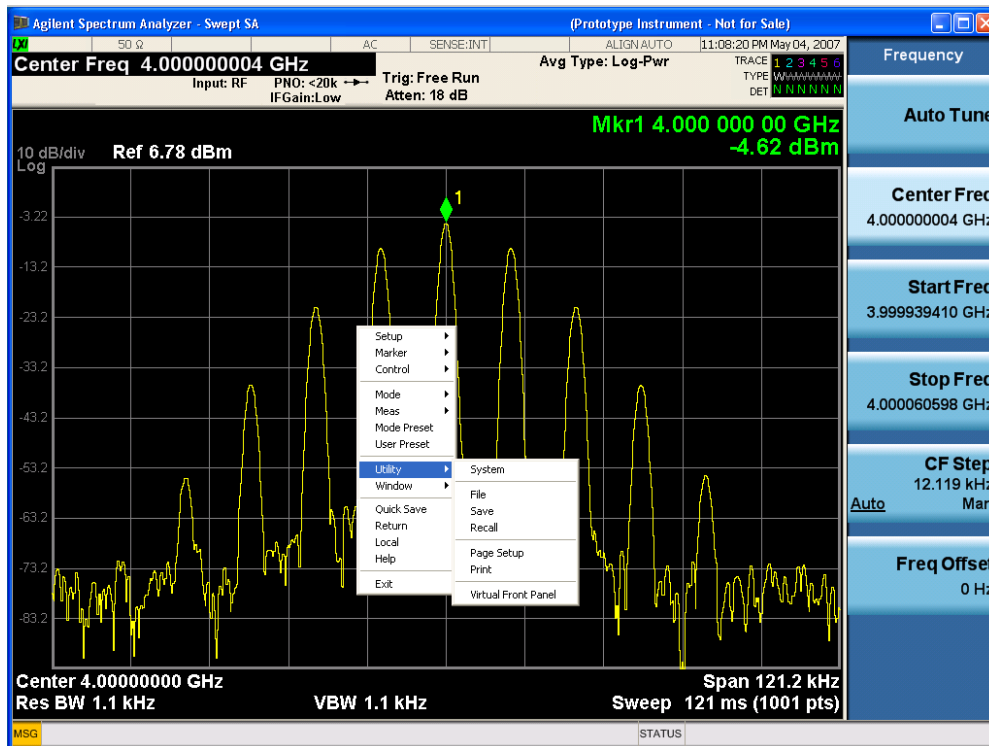
For instrument lacking a physical front panel display, you can watch the instrument display via external monitor or remote desktop connection

Right-Click

If you plug in a mouse and right-click on the analyzer screen, a menu will appear as below:



Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



This method can be used to access any of the front-panel keys by using a mouse; as for example if you are accessing the instrument through Remote Desktop.

The array of keys thus available is shown below:

PC Keyboard

If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

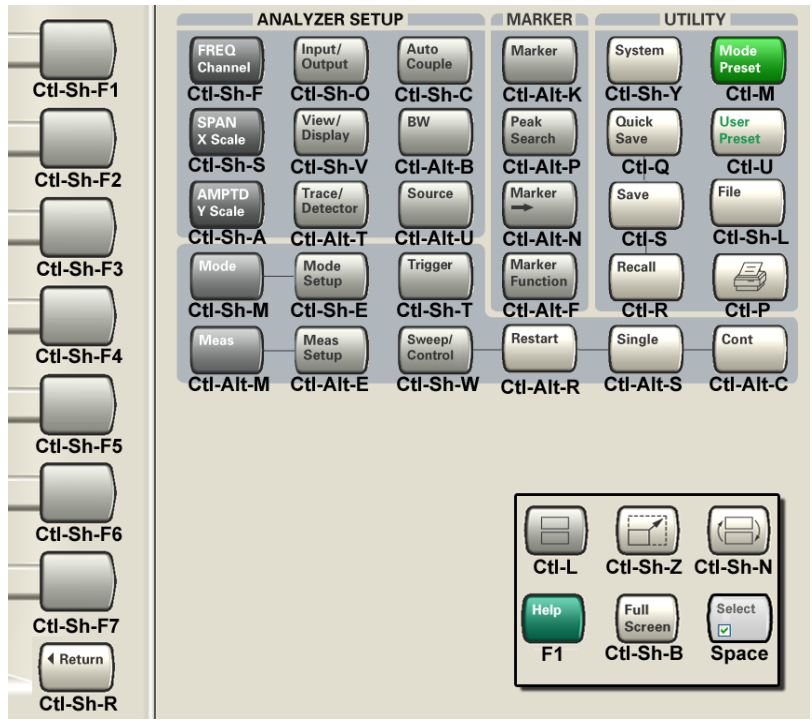
| Front-panel key | Key code |
|-----------------|--------------|
| Frequency | CTRL+SHIFT+F |
| Span | CTRL+SHIFT+S |
| Amplitude | CTRL+SHIFT+A |
| Input/Output | CTRL+SHIFT+O |
| View/Display | CTRL+SHIFT+V |
| Trace/Detector | CTRL+ALT+T |
| Auto Couple | CTRL+SHIFT+C |
| Bandwidth | CTRL+ALT+B |
| Source | CTRL+ALT-U |
| Marker | CTRL+ALT+K |
| Peak Search | CTRL+ALT+P |
| Marker To | CTRL+ALT+N |

| Front-panel key | Key code |
|------------------------|-----------------|
| Marker Function | CTRL+ALT+F |
| System | CTRL+SHIFT+Y |
| Quick Save | CTRL+Q |
| Save | CTRL+S |
| Recall | CTRL+R |
| Mode Preset | CTRL+M |
| User Preset | CTRL+U |
| Print | CTRL+P |
| File | CTRL+SHIFT+L |
| Mode | CTRL+SHIFT+M |
| Measure | CTRL+ALT+M |
| Mode Setup | CTRL+SHIFT+E |
| Meas Setup | CTRL+ALT+E |
| Trigger | CTRL+SHIFT+T |
| Sweep/Control | CTRL+SHIFT+W |
| Restart | CTRL+ALT+R |
| Single | CTRL+ALT+S |
| Cont | CTRL+ALT+C |
| Zoom | CTRL+SHIFT+Z |
| Next Window | CTRL+SHIFT+N |
| Split Screen | CTRL+L |
| Full Screen | CTRL+SHIFT+B |
| Return | CTRL+SHIFT+R |
| Mute | Mute |
| Inc Audio | Volume Up |
| Dec Audio | Volume Down |
| Help | F1 |
| Control | CTRL |
| Alt | ALT |
| Enter | Return |
| Cancel | Esc |
| Del | Delete |
| Backspace | Backspace |
| Select | Space |
| Up Arrow | Up |
| Down Arrow | Down |

| Front-panel key | Key code |
|-----------------|---------------|
| Left Arrow | Left |
| Right Arrow | Right |
| Menu key 1 | CTRL+SHIFT+F1 |
| Menu key 2 | CTRL+SHIFT+F2 |
| Menu key 3 | CTRL+SHIFT+F3 |
| Menu key 4 | CTRL+SHIFT+F4 |
| Menu key 5 | CTRL+SHIFT+F5 |
| Menu key 6 | CTRL+SHIFT+F6 |
| Menu key 7 | CTRL+SHIFT+F7 |
| Backspace | BACKSPACE |
| Enter | ENTER |
| Tab | Tab |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 0 | 0 |

This is a pictorial view of the table:

1 About the Test Set
 Mouse and Keyboard Control



Instrument Security & Memory Volatility

If you are using the instrument in a secure environment, you may need details of how to clear or sanitize its memory, in compliance with published security standards of the United States Department of Defense, or other similar authorities.

For X-Series test sets, this information is contained in the document "Security Features and Document of Volatility". This document is not included in the instrument on-disk library, but it may be downloaded from the Keysight web site.

To obtain a copy of the document, click on or browse to the following URL:

<http://www.keysight.com/find/security>

To locate and download the document, select Model Number, for example "E6607A", then click "Submit". Then, follow the on-screen instructions to download the file.

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

2 About the WLAN Measurement Application

This chapter describes WLAN measurements made by the test set.

What Does the Keysight V9077B WLAN Measurement Application Do?

The Keysight V9077B WLAN measurement application can be used to quickly ensure a product development conforms to regulatory requirements, as well as providing RF diagnostic and troubleshooting capability for a WLAN device.

WLAN measurement application provides the following measurements:

- Channel Power
- Occupied Bandwidth
- Spectrum Emission Mask
- Power vs Time
- Spectral Flatness
- Modulation Analysis

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

3 Programming the Test Set

This section provides introductory information about the programming documentation included with your product.

"What Programming Information is Available?" on page 88

"STATus Subsystem " on page 122

"Common Commands" on page 151

What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system. It can also be found online at: <http://www.keysight.com/find/exf>.

The following resources are available to help you create programs for automating your X-Series measurements:

| Resource | Description |
|---|---|
| X-Series Programmer's Guide | <p>Provides general SCPI programming information on the following topics:</p> <ul style="list-style-type: none">• Programming the X-Series Applications• Programming fundamentals• Programming examples <p>Note that SCPI command descriptions for measurement applications are not in this book, but are in the User's and Programmer's Reference.</p> |
| User's and Programmer's Reference manuals | <p>Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that:</p> <ul style="list-style-type: none">• Each measurement application has its own User's and Programmer's Reference.• The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual). |
| Embedded Help in your instrument | <p>Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application. Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.</p> |
| X-Series Getting Started Guide | <p>Provides valuable sections related to programming including:</p> <ul style="list-style-type: none">• Licensing New Measurement Application Software - After Initial Purchase• Configuring instrument LAN Hostname, IP Address, and Gateway Address• Using the Windows XP Remote Desktop to connect to the instrument remotely• Using the Embedded Web Server Telnet connection to communicate SCPI <p>This printed document is shipped with the instrument.</p> |
| Keysight Application Notes | <p>Printable PDF versions of pertinent application notes.</p> |
| Keysight VISA User's Guide | <p>Describes the Keysight Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.</p> |

List of SCPI Commands

```

*CAL?
*CLS
*ESE <integer>
*ESE?
*ESR?
*IDN?
*OPC
*OPC?
*OPT?
*RCL <register#>
*RST
*SAV <register#>
*SRE <integer>
*SRE?
*STB?
*TRG
*TST?
*WAI
ABORT
CALCulate:EVM:SPECTrum?
CALCulate:FLATness:SPECTrum?
CALCulate:CHPower:LIMit:POWer <ampl>
CALCulate:CHPower:LIMit:POWer?
CALCulate:CHPower:LIMit:POWer:FAIL?
CALCulate:CHPower:LIMit:POWer:STATe OFF | ON | 0 | 1
CALCulate:CHPower:LIMit:POWer:STATe?
CALCulate:CHPower:LIMit:PSDensity <real>
CALCulate:CHPower:LIMit:PSDensity?
CALCulate:CHPower:LIMit:PSDensity:STATe OFF | ON | 0 | 1
CALCulate:CHPower:LIMit:PSDensity:STATe?
CALCulate:CHPower:LIMit:PSD:FAIL?
CALCulate:CHPower:MARKer:AOFF
CALCulate:CHPower:MARKer[1]|2|...|12:MAXimum
CALCulate:CHPower:MARKer[1]|2|...|12:MODE POSITION | DELTA | OFF
CALCulate:CHPower:MARKer[1]|2|...|12:MODE?
CALCulate:CHPower:MARKer[1]|2|...|12:REfERENCE <integer>
CALCulate:CHPower:MARKer[1]|2|...|12:REfERENCE?
CALCulate:CHPower:MARKer[1]|2|...|12:STATe OFF | ON | 0 | 1
CALCulate:CHPower:MARKer[1]|2|...|12:STATe?
CALCulate:CHPower:MARKer[1]|2|...|12:X <real>
CALCulate:CHPower:MARKer[1]|2|...|12:X?
CALCulate:CHPower:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:CHPower:MARKer[1]|2|...|12:X:POSition?
CALCulate:CHPower:MARKer[1]|2|...|12:Y?
CALCulate:CLIMits:FAIL?
CALCulate:DATA<n>:COMPRESS? BLOCK | CFIT | MAXimum | MINimum | MEAN |
DMEan | RMS | RMSCubed | SAMPLE | SDEviation | PPHase[, <soffset>[,
<length>[, <roffset>[, <rlimit>]]]]
CALCulate:DATA[n]?

```

3 Programming the Test Set

List of SCPI Commands

```
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |  
FREQuency | TIME]  
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |  
FREQuency | TIME[, ALL | GTDLine | LTDLine]]  
CALCulate:EVM:EQUalizer:TMODe SEQuence | SDATA  
CALCulate:EVM:EQUalizer:TMODe?  
CALCulate:EVM:IQEstimation OFF | ON | 0 | 1  
CALCulate:EVM:IQEstimation?  
CALCulate:EVM:IQNorm OFF | ON | 0 | 1  
CALCulate:EVM:IQNorm?  
CALCulate:EVM:LIMit:CARRier <rel_ampl>  
CALCulate:EVM:LIMit:CARRier?  
CALCulate:EVM:LIMit:CFLeakage <rel_ampl>  
CALCulate:EVM:LIMit:CFLeakage?  
CALCulate:EVM:LIMit:CHIP <percent>  
CALCulate:EVM:LIMit:CHIP?  
CALCulate:EVM:LIMit:CLKerror <real>  
CALCulate:EVM:LIMit:CLKerror ?  
CALCulate:EVM:LIMit:FERRor <real>  
CALCulate:EVM:LIMit:FERRor ?  
CALCulate:EVM:LIMit:IQOffset <rel_ampl>  
CALCulate:EVM:LIMit:RMS <percent>  
CALCulate:EVM:LIMit:RMS?  
CALCulate:EVM:LIMit:RMS:BPSK:R1B2 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:BPSK:R1B2  
CALCulate:EVM:LIMit:RMS:M9 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M18 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M6 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M12 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M24 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M36 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M54 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M48 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:M24?  
CALCulate:EVM:LIMit:RMS:M36?  
CALCulate:EVM:LIMit:RMS:M12?  
CALCulate:EVM:LIMit:RMS:M18?  
CALCulate:EVM:LIMit:RMS:M9?  
CALCulate:EVM:LIMit:RMS:M6?  
CALCulate:EVM:LIMit:RMS:M54?  
CALCulate:EVM:LIMit:RMS:M48?  
CALCulate:EVM:LIMit:RMS:QA16:R1B2 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA16:R1B2  
CALCulate:EVM:LIMit:RMS:QA16:R3B4 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA64:R2B3 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA64:R3B4 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA64:R3B4  
CALCulate:EVM:LIMit:RMS:QA256:R5B6  
CALCulate:EVM:LIMit:RMS:QA256:R5B6 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA256:R3B4  
CALCulate:EVM:LIMit:RMS:QA256:R3B4 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA64:R5B6 <rel_ampl>  
CALCulate:EVM:LIMit:RMS:QA64:R5B6
```

```

CALCulate:EVM:LIMit:RMS:QA64:R2B3?
CALCulate:EVM:LIMit:RMS:QA16:R3B4?
CALCulate:EVM:LIMit:RMS:QPSK:R3B4
CALCulate:EVM:LIMit:RMS:QPSK:R3B4 <rel_ampl>
CALCulate:EVM:LIMit:RMS:QPSK:R1B2
CALCulate:EVM:LIMit:RMS:QPSK:R1B2 <rel_ampl>
CALCulate:EVM:MARKer:AOff
CALCulate:EVM:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:EVM:MARKer:COUple[:STATE]?
CALCulate:EVM:MARKer[1]|2|...|12:MAXimum
CALCulate:EVM:MARKer[1]|2|...|12:MAXimum:LEFT
CALCulate:EVM:MARKer[1]|2|...|12:MAXimum:NEXT
CALCulate:EVM:MARKer[1]|2|...|12:MAXimum:RIGHT
CALCulate:EVM:MARKer[1]|2|...|12:MINimum
CALCulate:EVM:MARKer[1]|2|...|12:MODE POSITION | DELTA | OFF
CALCulate:EVM:MARKer[1]|2|...|12:MODE?
CALCulate:EVM:MARKer[1]|2|...|12:PTPeak
CALCulate:EVM:MARKer[1]|2|...|12:REference <integer>
CALCulate:EVM:MARKer[1]|2|...|12:REference?
CALCulate:EVM:MARKer[1]|2|...|12:STATE OFF | ON | 0 | 1
CALCulate:EVM:MARKer[1]|2|...|12:STATE?
CALCulate:EVM:MARKer[1]|2|...|12:TRACe SYMBol | POLar | EVCarrier |
RECarrier | EVSymbol | RESymbol | PCARrier | RPCarrier | PSYMBOL |
RPSymbol | FLATness | DFLatness | PVT | SPECTrum
CALCulate:EVM:MARKer[1]|2|...|12:TRACe POLar | EVM | MERRor | PERRor |
EVMS | EVMC | PFError | IQGain | IQQuad | IQTime
CALCulate:EVM:MARKer[1]|2|...|12:TRACe?
CALCulate:EVM:MARKer[1]|2|...|12:TRACe?
CALCulate:EVM:MARKer[1]|2|...|12:X <real>
CALCulate:EVM:MARKer[1]|2|...|12:X?
CALCulate:EVM:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:EVM:MARKer[1]|2|...|12:X:POSition?
CALCulate:EVM:MARKer[1]|2|...|12:Y?
CALCulate:EVM:MARKer:AOff
CALCulate:EVM:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:EVM:MARKer:COUple[:STATE]?
CALCulate:EVM:MARKer[1]|2|...|12:MODE POSITION | DELTA | =OFF
CALCulate:EVM:MARKer[1]|2|...|12:MODE?
CALCulate:EVM:MARKer[1]|2|...|12:REference <integer>
CALCulate:EVM:MARKer[1]|2|...|12:REference?
CALCulate:EVM:PIlot:TRACk:AMPLitude OFF | ON | 0 | 1
CALCulate:EVM:PIlot:TRACk:AMPLitude?
CALCulate:EVM:PIlot:TRACk:PHASe OFF | ON | 0 | 1
CALCulate:EVM:PIlot:TRACk:PHASe?
CALCulate:EVM:PIlot:TRACk:TIMing OFF | ON | 0 | 1
CALCulate:EVM:PIlot:TRACk:TIMing?
CALCulate:EVM:SEGment SEG1 | SEG2
CALCulate:EVM:SEGment?
CALCulate:EVM:SPECTrum INVert | NORMAl
CALCulate:EVM:SUBCarrier ALL | PILOT | SINGLE
CALCulate:EVM:SUBCarrier?
CALCulate:EVM:SUBCarrier:COUNT

```

```
CALCulate:EVM:SUBCarrier:COUNT <integer>
CALCulate:FLATness:LIMit:LOWer:SECTIon2 <rel_amp>
CALCulate:FLATness:LIMit:LOWer:SECTIon1 <rel_amp>
CALCulate:FLATness:LIMit:LOWer:SECTIon2?
CALCulate:FLATness:LIMit:LOWer:SECTIon1?
CALCulate:FLATness:LIMit:UPPer:SECTIon2 <rel_amp>
CALCulate:FLATness:LIMit:UPPer:SECTIon1 <rel_amp>
CALCulate:FLATness:LIMit:UPPer:SECTIon1?
CALCulate:FLATness:LIMit:UPPer:SECTIon2?
CALCulate:FLATness:MARKer:AOFF
CALCulate:FLATness:MARKer:COUple[:STATe] ON | OFF | 1 | 0
CALCulate:FLATness:MARKer:COUple[:STATe]?
CALCulate:FLATness:MARKer[1]|2|...|12:MAXimum
CALCulate:FLATness:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:FLATness:MARKer[1]|2|...|12:MODE?
CALCulate:FLATness:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:FLATness:MARKer[1]|2|...|12:REFerence?
CALCulate:FLATness:MARKer[1]|2|...|12:TRACe FLATness | ULIMit | LLIMit
CALCulate:FLATness:MARKer[1]|2|...|12:TRACe?
CALCulate:FLATness:MARKer[1]|2|...|12:X <real>
CALCulate:FLATness:MARKer[1]|2|...|12:X?
CALCulate:FLATness:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:FLATness:MARKer[1]|2|...|12:X:POSition?
CALCulate:FLATness:MARKer[1]|2|...|12:Y?
CALCulate:FLATness:SEGment:LIST:LIMit:LOWer <rel_ampl>, ...
CALCulate:FLATness:SEGment:LIST:LIMit:LOWer <rel_ampl>, ...
CALCulate:FLATness:SEGment:LIST:LIMit:LOWer?
CALCulate:FLATness:SEGment:LIST:LIMit:LOWer?
CALCulate:FLATness:SEGment:LIST:LIMit:UPPer <rel_ampl>, ...
CALCulate:FLATness:SEGment:LIST:LIMit:UPPer <rel_ampl>, ...
CALCulate:FLATness:SEGment:LIST:LIMit:UPPer?
CALCulate:FLATness:SEGment:LIST:LIMit:UPPer?
CALCulate:FLATness:SPECtrum INVert | NORMAl
CALCulate:FPOWER:POWER[1,2,...,999]?
CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine "configurationstring"
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
CALCulate:FPOWER:POWER[1,2,...,999]:READ?
CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
CALCulate:FPOWER:POWER[1,2,...,999]:RESet
CALCulate:OBWidth:LIMit:FBLimit <freq>
CALCulate:OBWidth:LIMit:FBLimit?
CALCulate:OBWidth:LIMit[:TEST] ON | OFF | 1 | 0
CALCulate:OBWidth:LIMit[:TEST]?
CALCulate:OBWidth:MARKer:AOFF
CALCulate:OBWidth:MARKer[1]|2|...|12:MAXimum
CALCulate:OBWidth:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:OBWidth:MARKer[1]|2|...|12:MODE?
CALCulate:OBWidth:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:OBWidth:MARKer[1]|2|...|12:REFerence?
```



```

CALCulate:OBWidth:MARKer[1]|2|...|12:STATE OFF | ON | 0 | 1
CALCulate:OBWidth:MARKer[1]|2|...|12:STATE?
CALCulate:OBWidth:MARKer[1]|2|...|12:X <freq>
CALCulate:OBWidth:MARKer[1]|2|...|12:X?
CALCulate:OBWidth:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:OBWidth:MARKer[1]|2|...|12:X:POSition?
CALCulate:OBWidth:MARKer[1]|2|...|12:Y?
CALCulate:PVTime:FAIL UP | DOWN | BOTH
CALCulate:PVTime:FAIL?
CALCulate:PVTime:LIMit:DRTime
CALCulate:PVTime:LIMit:RDTime <time>
CALCulate:PVTime:LIMit:RDTime?
CALCulate:PVTime:LIMit:RUTime <time>
CALCulate:PVTime:LIMit:RUTime?
CALCulate:PVTime:LIMit:URTime
CALCulate:PVTime:MARKer:AOFF
CALCulate:PVTime:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:PVTime:MARKer:COUple[:STATE]?
CALCulate:PVTime:MARKer[1]|2|...|12:MAXimum
CALCulate:PVTime:MARKer[1]|2|...|12:MODE POSition | DELTA | OFF
CALCulate:PVTime:MARKer[1]|2|...|12:MODE?
CALCulate:PVTime:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:PVTime:MARKer[1]|2|...|12:REFerence?
CALCulate:PVTime:MARKer[1]|2|...|12:TRACE RFENvelope | MAXHold | MINHold |
RMS70
CALCulate:PVTime:MARKer[1]|2|...|12:TRACE?
CALCulate:SEMAsk:LLINE:STATE ON | OFF | 1 | 0
CALCulate:SEMAsk:LLINE:STATE?
CALCulate:SEMAsk:MARKer:AOFF
CALCulate:SEMAsk:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:SEMAsk:MARKer:COUple[:STATE]?
CALCulate:SEMAsk:MARKer[1]|2|...|12:FUNCTion:RESult?
CALCulate:SEMAsk:MARKer[1]|2|...|12:MODE POSition | OFF
CALCulate:SEMAsk:MARKer[1]|2|...|12:MODE?
CALCulate:SEMAsk:MARKer[1]|2|...|12:X <freq>
CALCulate:SEMAsk:MARKer[1]|2|...|12:X?
CALCulate:SEMAsk:MARKer[1]|2|...|12:X:POSition <real>
CALCulate:SEMAsk:MARKer[1]|2|...|12:X:POSition?
CALCulate:SEMAsk:MARKer[1]|2|...|12:Y?
CALCulate:WAVEform:MARKer:AOFF
CALCulate:WAVEform:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:WAVEform:MARKer:COUple[:STATE]?
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion BPOwer | BDENsity | OFF
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion?
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:LEFT <time>
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:LEFT?
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:RIGHT <time>
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:RIGHT?
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:SPAN <time>
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:BAND:SPAN?
CALCulate:WAVEform:MARKer[1]|2|...|12:FUNCTion:RESult?
CALCulate:WAVEform:MARKer[1]|2|...|12:MAXimum
CALCulate:WAVEform:MARKer[1]|2|...|12:MAXimum:NEXT

```

3 Programming the Test Set

List of SCPI Commands

```
CALCulate:WAVEform:MARKer[1]|2|...|12:MINimum
CALCulate:WAVEform:MARKer[1]|2|...|12:MODE POSITION | DELTA | OFF
CALCulate:WAVEform:MARKer[1]|2|...|12:MODE?
CALCulate:WAVEform:MARKer[1]|2|...|12:REFERENCE <integer>
CALCulate:WAVEform:MARKer[1]|2|...|12:REFERENCE?
CALCulate:WAVEform:MARKer[1]|2|...|12:TRACE RFENvelope | I | Q | IQ
CALCulate:WAVEform:MARKer[1]|2|...|12:TRACE?
CALCulate:WAVEform:MARKer[1]|2|...|12:X <time>
CALCulate:WAVEform:MARKer[1]|2|...|12:X?
CALCulate:WAVEform:MARKer[1]|2|...|12:X:POSITION <real>
CALCulate:WAVEform:MARKer[1]|2|...|12:X:POSITION?
CALCulate:WAVEform:MARKer[1]|2|...|4:X:SPAN
CALCulate:WAVEform:MARKer[1]|2|...|12:Y?
CALibration[:ALL]
CALibration[:ALL]?
CALibration[:ALL]:NPENDING
CALibration:EXPIred?
CALibration:IF
CALibration:IF?
CALibration:IF:NPENDING
CALibration:INTERNAL:SOURCE[:ALL]
CALibration:INTERNAL:SOURCE[:ALL]?
CALibration:INTERNAL:SOURCE[:ALL]:NPENDING
CALibration:NRF
CALibration:NRF?
CALibration:NRF:NPENDING
CALibration:RF
CALibration:RF?
CALibration:RF:NPENDING
CALibration:TEMPERature:CURRENT?
CALibration:TEMPERature:LALL?
CALibration:TEMPERature:LIF?
CALibration:TEMPERature:LRF?
CALibration:TIME:LALL?
CALibration:TIME:LIF?
CALibration:TIME:LRF?
CONF FSC
CONFigure?
CONFigure:CHPower
CONFigure:CHPower
CONFigure:CHPower:NDEFault
CONFigure:EVM
CONFigure:EVM
CONFigure:EVM:NDEFault
CONFigure:FLATness
CONFigure:FLATness
CONFigure:OBWidth
CONFigure:OBWidth
CONFigure:OBWidth:NDEFault
CONFigure:PVTime
CONFigure:PVTime
CONFigure:PVTime:NDEFault
CONFigure:SEMask
```

```

CONFigure:SEMask
CONFigure:SEMask:NDEFault
CONFigure:SPECtrum
CONFigure:SPECtrum:NDEFault
CONFigure:WAVEform
CONFigure:WAVEform:NDEFault
COUple ALL | NONE
DISPlay:<measurement>:ANNOtation:TITLe:DATA <string>
DISPlay:<measurement>:ANNOtation:TITLe:DATA?
DISPlay:ACTivefunc[:STATE] ON | OFF | 1 | 0
DISPlay:ACTivefunc[:STATE]?
DISPlay:ANNOtation:MBAR[:STATE] OFF | ON | 0 | 1
DISPlay:ANNOtation:MBAR[:STATE]?
DISPlay:ANNOtation:SCREen[:STATE] OFF | ON | 0 | 1
DISPlay:ANNOtation:SCREen[:STATE]?
DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph ON | OFF | 1 | 0
DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUple 0 | 1 | OFF | ON
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUple?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_amp>
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTER |
BOTTom
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:EVM:VIEW:NSElect <integer>
DISPlay:EVM:VIEW:NSElect?
DISPlay:EVM:VIEW[:SElect] POLar | IQERror | OFDM | DBITs | NRESults |
BHTSiginfo | PFERror | IQIMpair
DISPlay:EVM:VIEW[:SElect]?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:FVECTor[:STATE] 0 | 1 | OFF | ON
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:FVECTor[:STATE]?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQOFFset <integer>
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQOFFset?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQPoints <integer>
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQPoints?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:POLar VC | VECTor | CONSTln
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:POLar?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation <real>
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation?
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation:STATE 0 | 1 | OFF | ON
DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation:STATE?
DISPlay:FLATness:LLINE ON | OFF | 1 | 0
DISPlay:FLATness:LLINE?
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUple 0 | 1 | OFF | ON
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUple?
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?

```

3 Programming the Test Set

List of SCPI Commands

```
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTER  
| RIGHT  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE 0 | 1 | OFF | ON  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE?  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <rel_ampl>  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTER  
| BOTTOm  
DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE 0 | 1 | OFF | ON  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE?  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTER |  
BOTTOm  
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?  
DISPlay:PVTime:BLINes[:STATE] OFF | ON | 0 | 1  
DISPlay:PVTime:BLIN[:STATE]?  
DISPlay:PVTime:RAMP[:STATE] OFF | ON | 0 | 1  
DISPlay:PVTime:RAMP[:STATE]?  
DISPlay:PVTime:VIEW:NSElect <integer>  
DISPlay:PVTime:VIEW:NSElect?  
DISPlay:PVTime:VIEW[:SElect] ALL | BOTH  
DISPlay:PVTime:VIEW[:SElect]?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATE] ON | OFF | 1 | 0  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATE]?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATE] ON | OFF | 1 | 0  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATE]?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPlE 0 | 1 | OFF | ON  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPlE?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTER |  
RIGHT  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE 0 | 1 | OFF | ON  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPlE?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTER |  
BOTTOm  
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?  
DISPlay:SEMask:VIEW:NSElect <integer>
```

```

DISPlay:SEMask:VIEW:NSElect?
DISPlay:SEMask:VIEW[:SElect] APFReq | RPFReq | IPOWer | CINformation
DISPlay:SEMask:VIEW[:SElect]?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq>
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq>
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOStion LEFT | CENTER |
RIGHT
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOStion?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | ON | OFF
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOStion TOP | CENTER |
BOTTOm
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOStion?
DISPlay:WAVEform:VIEW:NSElect <integer>
DISPlay:WAVEform:VIEW:NSElect?
DISPlay:WAVEform:VIEW[:SElect] RFENvelope | IQ
DISPlay:WAVEform:VIEW[:SElect]?
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF |
ON
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOStion LEFT |
CENTER | RIGHT
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOStion?
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF |
ON
DISPlay:WAVEform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <voltage>
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <ampl>
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <voltage>
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOStion TOP | CENTER |
BOTTOm
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOStion TOP | CENTER
| BOTTOm
DISPlay:WAVEform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOStion?
DISPlay:WAVEform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOStion?

```

3 Programming the Test Set

List of SCPI Commands

```
DISPlay:WINDow[1]:ANNOtation[:ALL] OFF | ON | 0 | 1
DISPlay:WINDow[1]:ANNOtation[:ALL]?
DISPlay:WINDow:FORMat:TILE
DISPlay:WINDow:FORMat:ZOOM
DISPlay:WINDow[:SElect] <number>
DISPlay:WINDow[:SElect]?
DISPlay:WINDow[1]:TRACe:GRATICule:GRID[:STATE] OFF | ON | 0 | 1
DISPlay:WINDow[1]:TRACe:GRATICule:GRID[:STATE]?
FEED:RF:PORT:OUTP RFIO1
FETCh:CHPower:CHPower?
FETCh:CHPower:DENSity?
FETCh:CHPower[n]?
FETCh:EVM[n]?
FETCh:FLATness[n]?
FETCh:OBWidth:FERRor?
FETCh:OBWidth[n]?
FETCh:OBWidth:OBWidth?
FETCh:OBWidth:XDB?
FETCh:PVTime[n]?
FETCh:SEMask[n]?
FETCh:SPECTrum[n]?
FETCh:WAVEform[n]?
FORMat:BORDER NORMAL | SWAPPed
FORMat:BORDER?
FORMat[:TRACe][:DATA] ASCii | INTeger, 32 | REAL, 32 | REAL, 64
FORMat[:TRACe][:DATA]?
GLOBal:DEFault
GLOBal:FREQuency:CENTer[:STATE] 1 | 0 | ON | OFF
GLOBal:FREQuency:CENTer[:STATE]?
HCOpy:ABORT
HCOpy[:IMMediate]
INITiate:CHPower
INITiate:CONTinuous OFF | ON | 0 | 1
INITiate:CONTinuous?
INITiate:EVM
INITiate:FLATness
INITiate[:IMMediate]
INITiate:OBWidth
INITiate:PAUSE
INITiate:PVTime
INITiate:REStart
INITiate:RESume
INITiate:SEMask
INITiate:SPECTrum
INITiate:WAVEform
INPut<1|2>:TYPE INPUT1 | INPUT2
INPut<1|2>:TYPE?
INPut[1]|2:LISN:FILTer:HPAS[:STATE] ON | OFF
INPut[1]|2:LISN:FILTer:HPAS[:STATE]?
INPut[1]|2:LISN:PEARth GROUnded | FLOating
INPut[1]|2:LISN:PEARth?
INPut[1]|2:LISN:PHASe L1 | L2 | L3 | N
INPut[1]|2:LISN:PHASe?
```

```

INPut[1]|2:LISN[:TYPE] FOURphase | ESH2Z5 | ENV216 | OFF
INPut[1]|2:LISN[:TYPE]?
INPut:MIXer EXTernal | INTernal
INPut:MIXer?
INST:NSEL 102
INST:NSEL 105
INSTrument:CATalog?
INSTrument:COUPle:DEFault
INSTrument:COUPle:FREQuency:CENTer ALL | NONE
INSTrument:COUPle:FREQuency:CENTer?
INSTrument:DEFault
INSTrument:NSElect <integer>
INSTrument:NSElect?
INSTrument[:SElect] 'SA' | 'PNOISE' | 'EDGE' | 'GSM' | 'BASIC'
INSTrument[:SElect] SA | RTSA | SEQAN | EMI | BASIC | WCDMA | EDGE GSM |
WIMAXOFDMA | VSA | PNOISE | NFIGure | ADEMOD | BTooth | TDSCDMA | CDMA2K |
CDMA1XEV | LTE | LTETDD | LTEAFDD | LTEATDD | MSR | DVB | DTMB | DCTV |
ISDBT | CMMB | WLAN | CWLAN | CWIMAXOFDM | WIMAXFIXED | IDEN | RLC |
SCPILC | VSA89601
INSTrument[:SElect] GSM
INSTrument[:SElect] SANalyzer
INSTrument[:SElect] RECeiver
INSTrument[:SElect]?
INST:SEL LTETDD
INST:SEL LTE
INST:SEL EMI
INST:SEL SCPILC
MEASure:CHPower:CHPower?
MEASure:CHPower:DENSity?
MEASure:CHPower[n]?
MEASure:EVM[n]?
MEASure:FLATness[n]?
MEASure:OBWidth:FERRor?
MEASure:OBWidth[n]?
MEASure:OBWidth:OBWidth?
MEASure:OBWidth:XDB?
MEASure:PVTime[n]?
MEASure:SEMask[n]?
MEASure:SPECTrum[n]?
MEASure:WAVEform[n]?
MMEMory:CATalog? [<directory_name>]
MMEMory:CDIRectory [<directory_name>]
MMEMory:CDIRectory?
MMEMory:COPY <string>, <string>[, <string>, <string>]
MMEMory:COPY:DEVIce <source_string>, <dest_string>
MMEMory:DATA <file_name>, <data>
MMEMory:DATA? <file_name>
MMEMory:DELeTe <file_name>[, <directory_name>]
MMEMory:HEADer:ID? "<filename>"
MMEMory:LOAD:MASK <string>
MMEMory:LOAD:SEQuences:| SLIST | ALIST | SAALIST | "MySequence.txt"
MMEMory:LOAD:STATE <filename>

```

3 Programming the Test Set

List of SCPI Commands

```
MMEMemory:LOAD:STATE 1, <filename>
MMEMemory:MDIRectory <directory_name>
MMEMemory:MOVE <string>, <string>[, <string>, <string>]
MMEMemory:RDIRectory <directory_name>
MMEMemory:REGister:STATE:LABel <regnumber>, "label"
MMEMemory:REGister:STATE:LABel? <regnumber>
MMEMemory:STORE:SCREen <filename>
MMEMemory:STORE:SCREen:THEME TDColor | TDMonochrome | FCOLor | FMONochrome
MMEMemory:STORE:SCREen:THEME?
MMEMemory:STORE:STATE <filename>
MMEMemory:STORE:STATE 1, <filename>
MME:STOR:SEQuences:| SLIST | ALIST | SAAList | SStep"MySequence.txt"
OUTPut:ANALog OFF | SVIDeo | LOGVideo | LINVideo | DAUDio
OUTPut:ANALog?
OUTPut:ANALog:AUTO OFF | ON | 0 | 1
OUTPut:ANALog:AUTO?
OUTPut[:EXTErnal][:STATE] ON | OFF | 1 | 0
OUTPut[:EXTErnal][:STATE]?
OUTPut:MODulation[:STATE] ON | OFF | 1 | 0
OUTPut:MODulation[:STATE]?
READ:CHPower:CHPower?
READ:CHPower:DENSity
READ:CHPower[n]?
READ:EVM[n]?
READ:FLATness[n]?
READ:OBwidth:FERRor?
READ:OBwidth[n]?
READ:OBwidth:OBwidth?
READ:OBwidth:XDB?
READ:PVTTime[n]?
READ:SEMAsk[n]?
READ:SPECTrum[n]?
READ:WAVEform[n]?
[:SENSe]:<measurement>:TRIGger:SOURce IF
[:SENSe]:<measurement>:TRIGger:SOURce
[:SENSe]:ACPR:TRIGger:SOURce
[:SENSe]:CHPower:AVERAge:COUNT <integer>
[:SENSe]:CHPower:AVERAge:COUNT?
[:SENSe]:CHPower:AVERAge[:STATE] ON | OFF | 1 | 0
[:SENSe]:CHPower:AVERAge[:STATE]?
[:SENSe]:CHPower:AVERAge:TCONtrol EXPonential | REPeat
[:SENSe]:CHPower:AVERAge:TCONtrol?
[:SENSe]:CHPower:BANDwidth:INTEgration <bandwidth>
[:SENSe]:CHPower:BANDwidth:INTEgration?
[:SENSe]:CHPower:BANDwidth[:RESolution] <bandwidth>
[:SENSe]:CHPower:BANDwidth[:RESolution]?
[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO ON | OFF | 1 | 0
[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO?
[:SENSe]:CHPower:BANDwidth:SHAPE GAUSSian | FLATtop
[:SENSe]:CHPower:BANDwidth:SHAPE?
[:SENSe]:CHPower:BANDwidth:VIDeo <bandwidth>
[:SENSe]:CHPower:BANDwidth:VIDeo?
[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO ON | OFF | 1 | 0
```



```

[:SENSE]:CHPower:BANDwidth:VIDeo:AUTO?
[:SENSE]:CHPower:BWIDth[:RESolution]
[:SENSE]:CHPower:BWIDth:SHAPE
[:SENSE]:CHPower:DETEctor:AUTO ON | OFF | 1 | 0
[:SENSE]:CHPower:DETEctor:AUTO?
[:SENSE]:CHPower:DETEctor[:FUNCTion] NORMal | AVERage | POSitive | SAMple
| NEGative
[:SENSE]:CHPower:DETEctor[:FUNCTion]?
[:SENSE]:CHPower:FILTer[:RRC]:ALPHa <real>
[:SENSE]:CHPower:FILTer[:RRC]:ALPHa?
[:SENSE]:CHPower:FILTer[:RRC]:BANDwidth <real>
[:SENSE]:CHPower:FILTer[:RRC]:BANDwidth?
[:SENSE]:CHPower:FILTer[:RRC]:BWIDth
[:SENSE]:CHPower:FILTer[:RRC][:STATE] OFF | ON | 0 | 1
[:SENSE]:CHPower:FILTer[:RRC][:STATE]?
[:SENSE]:CHPower:FREQuency:SPAN <freq>
[:SENSE]:CHPower:FREQuency:SPAN?
[:SENSE]:CHPower:FREQuency:SPAN:AUTO ON | OFF | 1 | 0
[:SENSE]:CHPower:FREQuency:SPAN:AUTO?
[:SENSE]:CHPower:FREQuency:SPAN:FULL
[:SENSE]:CHPower:FREQuency:SPAN:PREVious
[:SENSE]:CHPower:SWEep:POINts <integer>
[:SENSE]:CHPower:SWEep:POINts?
[:SENSE]:CHPower:SWEep:TIME <time>
[:SENSE]:CHPower:SWEep:TIME?
[:SENSE]:CHPower:SWEep:TIME:AUTO OFF | ON | 0 | 1
[:SENSE]:CHPower:SWEep:TIME:AUTO?
[:SENSE]:CHPower:SWEep:TIME:AUTO:RULEs NORMal | ACCuracy
[:SENSE]:CHPower:SWEep:TIME:AUTO:RULEs?
[:SENSE]:CORREction:BTS[:RF]:GAIN <rel_ampl>
[:SENSE]:CORREction:BTS[:RF]:GAIN?
[:SENSE]:CORREction:BTS[:RF]:LOSS <rel_ampl>
[:SENSE]:CORREction:BTS[:RF]:LOSS?
[:SENSE]:CORREction:CSET:ALL:DELeTe
[:SENSE]:CORREction:CSET:ALL[:STATE] ON | OFF | 1 | 0
[:SENSE]:CORREction:CSET:ALL[:STATE]?
[:SENSE]:CORREction:CSET[1]:ANTenna[:UNIT] GAUSS | PTESla | UVM | UAM | UA
| NOConversion
[:SENSE]:CORREction:CSET[1]:ANTenna[:UNIT]?
[:SENSE]:CORREction:CSET[1]|2|...|8:COMMeNt "text"
[:SENSE]:CORREction:CSET[1]|2|...|8:COMMeNt?
[:SENSE]:CORREction:CSET[1]|2|...|8:DATA <freq>, <ampl>, ...
[:SENSE]:CORREction:CSET[1]|2|...|8:DATA?
[:SENSE]:CORREction:CSET[1]|2|...|8:DATA:MERGe <freq>, <ampl>, ...
[:SENSE]:CORREction:CSET[1]|2|...|6:DELeTe
[:SENSE]:CORREction:CSET[1]|2|...|8:DESCription "text"
[:SENSE]:CORREction:CSET[1]|2|...|8:DESCription?
[:SENSE]:CORREction:CSET[1]|2|...|8:RF:PORT RFIN | RFIO1 | RFIO2 | RFOUt |
GPSout | GNSSout | RFIO3 | RFIO4
[:SENSE]:CORREction:CSET[1]|2|...|8:RF:PORT?
[:SENSE]:CORREction:CSET[1]|2|...|8:RF:PORT:RFIO1 SOURce | ANALyzer | BOTH
[:SENSE]:CORREction:CSET[1]|2|...|8:RF:PORT:RFIO2 SOURce | ANALyzer | BOTH

```

3 Programming the Test Set
List of SCPI Commands

```
[ :SENSe]:CORRection:CSET[1]|2|...|8:RF:PORT:RFIO1?
[:SENSe]:CORRection:CSET[1]|2|...|8:RF:PORT:RFIO2?
[:SENSe]:CORRection:CSET[1]|2|...|8[:STATE] ON | OFF | 1 | 0
[:SENSe]:CORRection:CSET[1]|2|...|8[:STATE]?
[:SENSe]:CORRection:CSET[1]|2|...|8:X:SPACing LINear | LOGarithmic
[:SENSe]:CORRection:CSET[1]|2|...|8:X:SPACing?
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50 | 75
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?
[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>
[:SENSe]:CORRection:MS[:RF]:GAIN?
[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl>
[:SENSe]:CORRection:MS[:RF]:LOSS?
[:SENSe]:CORRection:OFFSet[:MAGNitude]
[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>
[:SENSe]:CORRection:SA[:RF]:GAIN?
[:SENSe]:DEMod[:WLAN]:AC160:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | QAM1024 | SIG
[:SENSe]:DEMod[:WLAN]:AC40:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | QAM1024 | SIG
[:SENSe]:DEMod[:WLAN]:AC20:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | QAM1024 | SIG
[:SENSe]:DEMod[:WLAN]:AC80:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | QAM1024 | SIG
[:SENSe]:DEMod[:WLAN]:AC20:FORMat?
[:SENSe]:DEMod[:WLAN]:AC40:FORMat?
[:SENSe]:DEMod[:WLAN]:AC160:FORMat?
[:SENSe]:DEMod[:WLAN]:AC80:FORMat?
[:SENSe]:DEMod[:WLAN]:AC20:GINTErval R1B4 | R1B8 | SIG | OTHER
[:SENSe]:DEMod[:WLAN]:AC160:GINTErval R1B4 | R1B8 | SIG | OTHER
[:SENSe]:DEMod[:WLAN]:AC80:GINTErval R1B4 | R1B8 | SIG | OTHER
[:SENSe]:DEMod[:WLAN]:AC40:GINTErval R1B4 | R1B8 | SIG | OTHER
[:SENSe]:DEMod[:WLAN]:AC80:GINTErval?
[:SENSe]:DEMod[:WLAN]:AC160:GINTErval?
[:SENSe]:DEMod[:WLAN]:AC20:GINTErval?
[:SENSe]:DEMod[:WLAN]:AC40:GINTErval?
[:SENSe]:DEMod[:WLAN]:AC40:GINTErval:LENGth <real>
[:SENSe]:DEMod[:WLAN]:AC20:GINTErval:LENGth <real>
[:SENSe]:DEMod[:WLAN]:AC80:GINTErval:LENGth <real>
[:SENSe]:DEMod[:WLAN]:AC160:GINTErval:LENGth <real>
[:SENSe]:DEMod[:WLAN]:AC80:GINTErval:LENGth?
[:SENSe]:DEMod[:WLAN]:AC40:GINTErval:LENGth?
[:SENSe]:DEMod[:WLAN]:AC20:GINTErval:LENGth?
[:SENSe]:DEMod[:WLAN]:AC160:GINTErval:LENGth?
[:SENSe]:DEMod[:WLAN]:AC40:SUBCarrier:SPACing <freq>
[:SENSe]:DEMod[:WLAN]:AC20:SUBCarrier:SPACing <freq>
[:SENSe]:DEMod[:WLAN]:AC160:SUBCarrier:SPACing <freq>
[:SENSe]:DEMod[:WLAN]:AC80:SUBCarrier:SPACing <freq>
[:SENSe]:DEMod[:WLAN]:AC160:SUBCarrier:SPACing?
[:SENSe]:DEMod[:WLAN]:AC20:SUBCarrier:SPACing?
[:SENSe]:DEMod[:WLAN]:AC80:SUBCarrier:SPACing?
[:SENSe]:DEMod[:WLAN]:AC40:SUBCarrier:SPACing?
```

```

[:SENSE]:DEMod[:WLAN]:ACT80:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | QAM1024 | SIG
[:SENSE]:DEMod[:WLAN]:ACT80:FORMat?
[:SENSE]:DEMod[:WLAN]:ACT80:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:ACT80:GINterval?
[:SENSE]:DEMod[:WLAN]:ACT80:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:ACT80:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:ACT80:SUBCarrier:SPACing <freq>
[:SENSE]:DEMod[:WLAN]:ACT80:SUBCarrier:SPACing?
[:SENSE]:DEMod[:WLAN]:AG:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64
[:SENSE]:DEMod[:WLAN]:AG:FORMat?
[:SENSE]:DEMod[:WLAN]:AG:GINterval?
[:SENSE]:DEMod[:WLAN]:AG:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AG:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:AG:GINtervalR1B4|R1B8|OTHer
[:SENSE]:DEMod[:WLAN]:AG:SUBCarrier:SPACing <freq>
[:SENSE]:DEMod[:WLAN]:AG:SUBCarrier:SPACing?
[:SENSE]:DEMod[:WLAN]:AH2:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | SIG
[:SENSE]:DEMod[:WLAN]:AH1:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | SIG
[:SENSE]:DEMod[:WLAN]:AH8:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | SIG
[:SENSE]:DEMod[:WLAN]:AH16:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | SIG
[:SENSE]:DEMod[:WLAN]:AH4:FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 |
QAM256 | SIG
[:SENSE]:DEMod[:WLAN]:AH1:FORMat?
[:SENSE]:DEMod[:WLAN]:AH2:FORMat?
[:SENSE]:DEMod[:WLAN]:AH4:FORMat?
[:SENSE]:DEMod[:WLAN]:AH16:FORMat?
[:SENSE]:DEMod[:WLAN]:AH8:FORMat?
[:SENSE]:DEMod[:WLAN]:AH16:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:AH4:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:AH8:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:AH2:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:AH1:GINterval R1B4 | R1B8 | SIG | OTHer
[:SENSE]:DEMod[:WLAN]:AH1:GINterval?
[:SENSE]:DEMod[:WLAN]:AH8:GINterval?
[:SENSE]:DEMod[:WLAN]:AH16:GINterval?
[:SENSE]:DEMod[:WLAN]:AH2:GINterval?
[:SENSE]:DEMod[:WLAN]:AH4:GINterval?
[:SENSE]:DEMod[:WLAN]:AH8:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AH16:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AH2:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AH1:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AH4:GINterval:LENGth <real>
[:SENSE]:DEMod[:WLAN]:AH1:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:AH8:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:AH4:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:AH2:GINterval:LENGth?
[:SENSE]:DEMod[:WLAN]:AH16:GINterval:LENGth?

```

3 Programming the Test Set

List of SCPI Commands

```
[ :SENSe ] :DEMod [ :WLAN ] :AH8 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :AH16 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :AH4 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :AH2 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :AH1 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :AH2 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :AH4 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :AH8 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :AH16 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :AH1 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :BG :FORMat DSSS1 | DSSS2 | CCK55 | CCK11 | PBCC55 |
PBCC11 | PBCC22 | PBCC33
[ :SENSe ] :DEMod [ :WLAN ] :BG :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :GDO :FORMat AUTO | BPSK | QPSK | QAM16 | QAM64
[ :SENSe ] :DEMod [ :WLAN ] :GDO :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :GDO :GINterval R1B4 | R1B8 | OTHER
[ :SENSe ] :DEMod [ :WLAN ] :GDO :GINterval?
[ :SENSe ] :DEMod [ :WLAN ] :GDO :GINterval :LENGth <real>
[ :SENSe ] :DEMod [ :WLAN ] :GDO :GINterval :LENGth?
[ :SENSe ] :DEMod [ :WLAN ] :GDO :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :GDO :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :FORMat AUTO | BPSK | QPSK | QAM16 | QAM64
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :GINterval R1B4 | R1B8 | OTHER
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :GINterval?
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :GINterval :LENGth <real>
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :GINterval :LENGth?
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :JP10 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :N20 :FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 | SIG
[ :SENSe ] :DEMod [ :WLAN ] :N40 :FORMat AUTO | BPSK | QPSK | QAM16 | QAM64 | SIG
[ :SENSe ] :DEMod [ :WLAN ] :N40 :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :N20 :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :N20 :GINterval R1B4 | R1B8 | SIG | OTHER
[ :SENSe ] :DEMod [ :WLAN ] :N40 :GINterval R1B4 | R1B8 | SGI | OTHER
[ :SENSe ] :DEMod [ :WLAN ] :N20 :GINterval?
[ :SENSe ] :DEMod [ :WLAN ] :N40 :GINterval?
[ :SENSe ] :DEMod [ :WLAN ] :N20 :GINterval :LENGth <real>
[ :SENSe ] :DEMod [ :WLAN ] :N40 :GINterval :LENGth <real>
[ :SENSe ] :DEMod [ :WLAN ] :N20 :GINterval :LENGth?
[ :SENSe ] :DEMod [ :WLAN ] :N40 :GINterval :LENGth?
[ :SENSe ] :DEMod [ :WLAN ] :N20 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :N40 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :N20 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :N40 :SUBCarrier :SPACing?
[ :SENSe ] :DEMod [ :WLAN ] :P5 :FORMat AUTO | BPSK | QPSK | QAM16 | QAM64
[ :SENSe ] :DEMod [ :WLAN ] :P5 :FORMat?
[ :SENSe ] :DEMod [ :WLAN ] :P5 :GINterval R1B4 | R1B8 | OTHER
[ :SENSe ] :DEMod [ :WLAN ] :P5 :GINterval?
[ :SENSe ] :DEMod [ :WLAN ] :P5 :GINterval :LENGth <real>
[ :SENSe ] :DEMod [ :WLAN ] :P5 :GINterval :LENGth?
[ :SENSe ] :DEMod [ :WLAN ] :P5 :SUBCarrier :SPACing <freq>
[ :SENSe ] :DEMod [ :WLAN ] :P5 :SUBCarrier :SPACing?
```

```

[:SENSe]:EBWidth:AVERAge:COUNT
[:SENSe]:EBWidth:FREQuency:SPAN
[:SENSe]:EBWidth:MAXHold
[:SENSe]:EBWidth:XDB
[:SENSe]:EVM:AVERAge:COUNT <integer>
[:SENSe]:EVM:AVERAge:COUNT?
[:SENSe]:EVM:AVERAge[:STATE] OFF | ON | 0 | 1
[:SENSe]:EVM:AVERAge[:STATE]?
[:SENSe]:EVM:AVERAge:TCONtrol EXPonential | REPeat
[:SENSe]:EVM:AVERAge:TCONtrol?
[:SENSe]:EVM:BANDwidth[:RESolution] <bandwidth>
[:SENSe]:EVM:BANDwidth[:RESolution]?
[:SENSe]:EVM:COMPensate OFF | ON | 0 | 1
[:SENSe]:EVM:COMPensate?
[:SENSe]:EVM:EQUalizer:TRAIning SEQuence | SDATa
[:SENSe]:EVM:EQUalizer:TRAIning?
[:SENSe]:EVM:FILTer:ALPHa <real>
[:SENSe]:EVM:FILTer:ALPHa?
[:SENSe]:EVM:FILTer:BT <real>
[:SENSe]:EVM:FILTer:BT?
[:SENSe]:EVM:FILTer:MEASurement:TYPE NONE | RRC
[:SENSe]:EVM:FILTer:MEASurement:TYPE?
[:SENSe]:EVM:FILTer:REFerence:TYPE GAUSSian | RECT | RC
[:SENSe]:EVM:FILTer:REFerence:TYPE?
[:SENSe]:EVM:FREQ:SYNC?
[:SENSe]:EVM:FREQuency:SYNC PPILot | PPData | PREamble
[:SENSe]:EVM:IFBW
[:SENSe]:EVM:IQNorm OFF | ON | 0 | 1
[:SENSe]:EVM:IQNorm?
[:SENSe]:EVM:Mimo:MTYPE DMAP | FOURier
[:SENSe]:EVM:Mimo:MTYPE?
[:SENSe]:EVM:Mimo:TYPE M2M2 | M3M3M4M4
[:SENSe]:EVM:Mimo:TYPE?
[:SENSe]:EVM:MIRrorspec OFF | ON | 0 | 1
[:SENSe]:EVM:MIRrorspec?
[:SENSe]:EVM:STSequence LONG | SHORT
[:SENSe]:EVM:STSequence?
[:SENSe]:EVM:SYNCseq LONG | SHORT
[:SENSe]:EVM:SYNCseq?
[:SENSe]:EVM:TIME:INTerval <integer>
[:SENSe]:EVM:TIME:INTerval?
[:SENSe]:EVM:TIME:OFFSet <integer>
[:SENSe]:EVM:TIME:OFFSet?
[:SENSe]:EVM:TIME:RESMax <integer>
[:SENSe]:EVM:TIME:RESMax?
[:SENSe]:EVM:TIME:RESult:LENGth <integer>
[:SENSe]:EVM:TIME:RESult:LENGth?
[:SENSe]:EVM:TIME:RESult:MAX <integer>
[:SENSe]:EVM:TIME:RESult:MAX?
[:SENSe]:EVM:TIME:RESult:SIG OFF | ON | 0 | 1
[:SENSe]:EVM:TIME:RESult:SIG?
[:SENSe]:EVM:TIME:RESult[:STATE]:AUTO OFF | ON | 0 | 1
[:SENSe]:EVM:TIME:RESult[:STATE]:AUTO?

```

3 Programming the Test Set

List of SCPI Commands

```
[ :SENSe]:EVM:TIME:SEARChlength
[ :SENSe]:EVM:TIME:SEARChlength <real>
[ :SENSe]:EVM:TIME:SEARChlength?
[ :SENSe]:EVM:TIME:SLENgth <time>
[ :SENSe]:EVM:TIME:SLENgth?
[ :SENSe]:EVM:TRACk:AMP OFF | ON | 0 | 1
[ :SENSe]:EVM:TRACk:AMP?
[ :SENSe]:EVM:TRACk:TIMing
[ :SENSe]:FEED AREFERENCE
[ :SENSe]:FEED RF | AIQ | EMIXer
[ :SENSe]:FEED IQ | IONLy | QONLy
[ :SENSe]:FEED?
[ :SENSe]:FEED?
[ :SENSe]:FEED:DATA INPut | STORed
[ :SENSe]:FEED:DATA?
[ :SENSe]:FEED:DATA:STORE
[ :SENSe]:FEED:RF:PORT[:INPut] RFIN | RFIN2 | RFIO1 | RFIO2 | RFIO3 | RFIO4
[ :SENSe]:FEED:RF:PORT[:INPut]?
[ :SENSe]:FEED:RF:PORT:OUTPut RFOut | RFIO1 | RFIO2 | GPSout | GNSSout |
RFIO3 | RFIO4
[ :SENSe]:FEED:RF:PORT:OUTPut?
[ :SENSe]:FEED:SOURce INPut | STORed
[ :SENSe]:FEED:SOURce?
[ :SENSe]:FEED:SOURce:STORE
[ :SENSe]:FLATness:AVERage:COUNt <integer>
[ :SENSe]:FLATness:AVERage:COUNt?
[ :SENSe]:FLATness:AVERage[:STATe] OFF | ON | 0 | 1
[ :SENSe]:FLATness:AVERage[:STATe]?
[ :SENSe]:FLATness:AVERage:TCONtrol EXPonential | REPEAT
[ :SENSe]:FLATness:AVERage:TCONtrol?
[ :SENSe]:FLATness:BANDwidth[:RESolution] <bandwidth>
[ :SENSe]:FLATness:BANDwidth[:RESolution]?
[ :SENSe]:FLATness:BANDwidth:TYPE GAUSSian | FLATtop
[ :SENSe]:FLATness:BANDwidth:TYPE?
[ :SENSe]:FLATness:IFBW
[ :SENSe]:FLATness:MIRrorspec OFF | ON | 0 | 1
[ :SENSe]:FLATness:SLENgth <time>
[ :SENSe]:FLATness:SLENgth?
[ :SENSe]:FLATness:STSequence LONG | SHORT
[ :SENSe]:FLATness:STSequence?
[ :SENSe]:FLATness:SYNcseq
[ :SENSe]:FLATness:TADJust <percent>
[ :SENSe]:FLATness:TADJust?
[ :SENSe]:FLATness:TIMAdj <percent>
[ :SENSe]:FLATness:TIME:SEARChlen <time>
[ :SENSe]:FREQuency:CENTer <freq>
[ :SENSe]:FREQuency:CENTer?
[ :SENSe]:FREQuency:CENTer:STEP:AUTO OFF | ON | 0 | 1
[ :SENSe]:FREQuency:CENTer:STEP:AUTO?
[ :SENSe]:FREQuency:CENTer:STEP[:INCRement] <freq>
[ :SENSe]:FREQuency:CENTer:STEP[:INCRement]?
[ :SENSe]:FREQuency:EMIXer:CENTer <freq>
[ :SENSe]:FREQuency:EMIXer:CENTer?
```

```

[:SENSE]:FREQUENCY:IQ:CENTER <freq>
[:SENSE]:FREQUENCY:IQ:CENTER?
[:SENSE]:FREQUENCY:RF:CENTER <freq>
[:SENSE]:FREQUENCY:RF:CENTER?
[:SENSE]:HDUPLEX:PORT:INPUT RFIO3 | RFIO4
[:SENSE]:HDUPLEX:PORT:OUTPUT RFIO3 | RFIO4
[:SENSE]:OBWIDTH:AVERAGE:COUNT <integer>
[:SENSE]:OBWIDTH:AVERAGE:COUNT?
[:SENSE]:OBWIDTH:AVERAGE[:STATE] ON | OFF | 1 | 0
[:SENSE]:OBWIDTH:AVERAGE[:STATE]?
[:SENSE]:OBWIDTH:AVERAGE:TCONTROL EXPONENTIAL | REPEAT
[:SENSE]:OBWIDTH:AVERAGE:TCONTROL?
[:SENSE]:OBWIDTH:BANDWIDTH[:RESOLUTION] <bandwidth>
[:SENSE]:OBWIDTH:BANDWIDTH[:RESOLUTION]?
[:SENSE]:OBWIDTH:BANDWIDTH[:RESOLUTION]:AUTO ON | OFF | 1 | 0
[:SENSE]:OBWIDTH:BANDWIDTH[:RESOLUTION]:AUTO?
[:SENSE]:OBWIDTH:BANDWIDTH:SHAPE GAUSSIAN | FLATTOP
[:SENSE]:OBWIDTH:BANDWIDTH:SHAPE?
[:SENSE]:OBWIDTH:BANDWIDTH:VIDEO <bandwidth>
[:SENSE]:OBWIDTH:BANDWIDTH:VIDEO?
[:SENSE]:OBWIDTH:BANDWIDTH:VIDEO:AUTO ON | OFF | 1 | 0
[:SENSE]:OBWIDTH:BANDWIDTH:VIDEO:AUTO?
[:SENSE]:OBWIDTH:BWIDTh[:RESOLUTION]
[:SENSE]:OBWIDTH:BWIDTh:SHAPE
[:SENSE]:OBWIDTH:BWIDTh:VIDEO
[:SENSE]:OBWIDTH:DETECTOR:AUTO ON | OFF | 1 | 0
[:SENSE]:OBWIDTH:DETECTOR:AUTO?
[:SENSE]:OBWIDTH:DETECTOR[:FUNCTION] NORMAL | AVERAGE | POSITIVE | SAMPLE
| NEGATIVE
[:SENSE]:OBWIDTH:DETECTOR[:FUNCTION]?
[:SENSE]:OBWIDTH:FREQUENCY:SPAN <freq>
[:SENSE]:OBWIDTH:FREQUENCY:SPAN?
[:SENSE]:OBWIDTH:FREQUENCY:SPAN:AUTO ON | OFF | 0 | 1
[:SENSE]:OBWIDTH:FREQUENCY:SPAN:AUTO?
[:SENSE]:OBWIDTH:FREQUENCY:SPAN:FULL
[:SENSE]:OBWIDTH:FREQUENCY:SPAN:PREVIOUS
[:SENSE]:OBWIDTH:MAXHOLD ON | OFF | 1 | 0
[:SENSE]:OBWIDTH:MAXHOLD?
[:SENSE]:OBWIDTH:PERCENT <real>
[:SENSE]:OBWIDTH:PERCENT?
[:SENSE]:OBWIDTH:SWEPT:POINTS <integer>
[:SENSE]:OBWIDTH:SWEPT:POINTS?
[:SENSE]:OBWIDTH:SWEPT:TIME <time>
[:SENSE]:OBWIDTH:SWEPT:TIME?
[:SENSE]:OBWIDTH:SWEPT:TIME:AUTO OFF | ON | 0 | 1
[:SENSE]:OBWIDTH:SWEPT:TIME:AUTO?
[:SENSE]:OBWIDTH:SWEPT:TIME:AUTO:RULES NORMAL | ACCURACY
[:SENSE]:OBWIDTH:SWEPT:TIME:AUTO:RULES?
[:SENSE]:OBWIDTH:XDB <rel_ampl>
[:SENSE]:OBWIDTH:XDB?
[:SENSE]:POWER[:RF]:RANGE <real>
[:SENSE]:POWER[:RF]:RANGE?
[:SENSE]:POWER[:RF]:RANGE:MIXER:OFFSET <real>

```

3 Programming the Test Set

List of SCPI Commands

```
[ :SENSe]:POWER[:RF]:RANGe:MIXer:OFFSet?
[:SENSe]:POWER[:RF]:RANGe:OPTimize IMMEDIATE
[:SENSe]:POWER[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECTrical |
COMBined
[:SENSe]:POWER[:RF]:RANGe:OPTimize:ATTenuation?
[:SENSe]:POWER[:RF]:RANGe:PARatio <real>
[:SENSe]:POWER[:RF]:RANGe:PARatio?
[:SENSe]:PVTime:AVERAge:COUNT <integer>
[:SENSe]:PVTime:AVERAge:COUNT?
[:SENSe]:PVTime:AVERAge[:STATE] OFF | ON | 0 | 1
[:SENSe]:PVTime:AVERAge[:STATE]?
[:SENSe]:PVTime:AVERAge:TCONtrol EXponential | REPEAT
[:SENSe]:PVTime:AVERAge:TCONtrol?
[:SENSe]:PVTime:AVERAge:TYPE LOG | RMS
[:SENSe]:PVTime:AVERAge:TYPE?
[:SENSe]:PVTime:BANDwidth[:RESolution] <bandwidth>
[:SENSe]:PVTime:BANDwidth[:RESolution]?
[:SENSe]:PVTime:BANDwidth:TYPE GAUSSian | FLATtop
[:SENSe]:PVTime:BANDwidth:TYPE?
[:SENSe]:PVTime:BURSt
[:SENSe]:PVTime:BURSt:TIME <time>
[:SENSe]:PVTime:BURSt:TIME?
[:SENSe]:PVTime:IFBW
[:SENSe]:PVTime:LIST:FAIL
[:SENSe]:PVTime:LIST:LEVel:END
[:SENSe]:PVTime:LIST:LEVel:END
[:SENSe]:PVTime:LIST:LEVel:START
[:SENSe]:PVTime:LIST:LEVel:START
[:SENSe]:PVTime:RSLength <time>
[:SENSe]:PVTime:RSLength?
[:SENSe]:PVTime:RTIME
[:SENSe]:PVTime:THReshold:DOWN:START <rel_ampl>
[:SENSe]:PVTime:THReshold:DOWN:START?
[:SENSe]:PVTime:THReshold:DOWN:STOP <rel_ampl>
[:SENSe]:PVTime:THReshold:DOWN:STOP?
[:SENSe]:PVTime:THReshold:UP:START <rel_ampl>
[:SENSe]:PVTime:THReshold:UP:START?
[:SENSe]:PVTime:THReshold:UP:STOP <rel_ampl>
[:SENSe]:PVTime:THReshold:UP:STOP?
[:SENSe]:RADio:STANdard[:WLAN] AG | BG | GDO | N20 | N40AC20 | AC40 | AC80
| ACT80 | AC160 | AH1 | AH2 | AH4 | AH8 | AH16 | JP10 | P5
[:SENSe]:RADio:STANdard[:WLAN]?
[:SENSe]:ROSCillator:EXtErnal:FREQuency <freq>
[:SENSe]:ROSCillator:EXtErnal:FREQuency?
[:SENSe]:ROSCillator:SOURce INTernal | EXtErnal
[:SENSe]:ROSCillator:SOURce?
[:SENSe]:ROSCillator:SOURce:TYPE INTernal | EXtErnal | SENSE | PULSE
[:SENSe]:ROSCillator:SOURce:TYPE?
[:SENSe]:SEMAsk:AVERAge:COUNT <integer>
[:SENSe]:SEMAsk:AVERAge:COUNT?
[:SENSe]:SEMAsk:AVERAge[:STATE] ON | OFF | 1 | 0
[:SENSe]:SEMAsk:AVERAge[:STATE]?
[:SENSe]:SEMAsk:BANDwidth[1]|2:INTegration <bandwidth>
```



```

[:SENSE]:SEMask:BANDwidth[1]|2:INTEgration?
[:SENSE]:SEMask:BANDwidth[1]|2[:RESolution] <bandwidth>
[:SENSE]:SEMask:BANDwidth[1]|2[:RESolution]?
[:SENSE]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO OFF | ON | 1 | 0
[:SENSE]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO?
[:SENSE]:SEMask:BANDwidth:SHApe ASENse | GAUSSian | FLATtop
[:SENSE]:SEMask:BANDwidth:SHApe?
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo <bandwidth>
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo?
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:AUTO OFF | ON | 1 | 0
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:AUTO?
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:RATio <real>
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:RATio
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO OFF | ON | 1 | 0
[:SENSE]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO?
[:SENSE]:SEMask:BWIDth[1]|2[:RESolution]
[:SENSE]:SEMask:BWIDth[1]|2:VIDeo
[:SENSE]:SEMask:BWIDth[1]|2:VIDeo:RATio
[:SENSE]:SEMask:CARRier:AUTO[:STATE] OFF | ON | 1 | 0
[:SENSE]:SEMask:CARRier:AUTO[:STATE]?
[:SENSE]:SEMask:CARRier:CPSD <real>
[:SENSE]:SEMask:CARRier:CPSD?
[:SENSE]:SEMask:CARRier:PEAK[:POWER] <real>
[:SENSE]:SEMask:CARRier:PEAK[:POWER]?
[:SENSE]:SEMask:CARRier[:POWER] <real>
[:SENSE]:SEMask:CARRier[:POWER]?
[:SENSE]:SEMask:DETEctor:CARRier:AUTO ON | OFF | 1 | 0
[:SENSE]:SEMask:DETEctor:CARRier:AUTO?
[:SENSE]:SEMask:DETEctor:CARRier[:FUNCTion] AVERage | NEGative | NORMAl |
Positive | SAMPlE
[:SENSE]:SEMask:DETEctor:CARRier[:FUNCTion]?
[:SENSE]:SEMask:DETEctor:OFFSet:AUTO ON | OFF | 1 | 0
[:SENSE]:SEMask:DETEctor:OFFSet:AUTO?
[:SENSE]:SEMask:DETEctor:OFFSet[:FUNCTion] AVERage | NEGative | NORMAl |
Positive | SAMPlE
[:SENSE]:SEMask:DETEctor:OFFSet[:FUNCTion]?
[:SENSE]:SEMask:FILTer[:RRC]:ALPHa <real>
[:SENSE]:SEMask:FILTer[:RRC]:ALPHa?
[:SENSE]:SEMask:FILTer[:RRC][:STATE] OFF | ON | 0 | 1
[:SENSE]:SEMask:FILTer[:RRC][:STATE]?
[:SENSE]:SEMask:FREQuency[1]|2:SPAN <freq>
[:SENSE]:SEMask:FREQuency[1]|2:SPAN?
[:SENSE]:SEMask:FREQuency[1]|2:SPAN:AUTO ON | OFF | 1 | 0
[:SENSE]:SEMask:FREQuency[1]|2:SPAN:AUTO?
[:SENSE]:SEMask:OFFSet[1]|2:LIST:BWIDth:IMULti
[:SENSE]:SEMask:OFFSet[1]|2:LIST:BWIDth[:RESolution]
[:SENSE]:SEMask:OFFSet[1]|2:LIST:BWIDth:VIDeo
[:SENSE]:SEMask:OFFSet[1]|2:LIST:SWEep[:TIME]
[:SENSE]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:IMULti <integer>, ...
[:SENSE]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:IMULti?
[:SENSE]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]
<bandwidth>, ...

```

3 Programming the Test Set
List of SCPI Commands

```

[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO OFF |
ON | 1 | 0, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo <freq>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO OFF | ON | 0
| 1, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio <real>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO OFF |
ON | 0 | 1, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:FREQuency:START <freq>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:FREQuency:START?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STOP <freq>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STOP?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SIDE BOTH | NEGative | POSitive,
...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SIDE?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:START:ABSolute <real>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:START:ABSolute?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:START:RCARrier <rel_ampl>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:START:RCARrier?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STATE ON | OFF | 1 | 0, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STATE?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute <real>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute:COUple ON | OFF | 1
| 0, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute:COUple?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier <rel_ampl>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier:COUple ON | OFF | 1
| 0, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier:COUple?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME <time>, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME:AUTO ON | OFF | 1 | 0,
...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME:AUTO?
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:TEST ABSolute | AND | OR |
RELative, ...
[:SENSe]:SEMAsk:OFFSet[1]|2[:OUTer]:LIST:TEST?
[:SENSe]:SEMAsk:OFFSet[1]|2:TYPE CTOCenter | CTOEdge | ETOCenter | ETOEdge
[:SENSe]:SEMAsk:OFFSet[1]|2:TYPE?
[:SENSe]:SEMAsk:SWEep[1]|2:TIME <time>
[:SENSe]:SEMAsk:SWEep[1]|2:TIME?
[:SENSe]:SEMAsk:SWEep[1]|2:TIME:AUTO OFF | 0 | ON | 1
[:SENSe]:SEMAsk:SWEep[1]|2:TIME:AUTO?
[:SENSe]:SEMAsk:TYPE PSDRef | TPreF | SPRef

```

```

[:SENSe]:SEMask:TYPE?
[:SENSe]:SWEep:EGATE:DELAy <time>
[:SENSe]:SWEep:EGATE:DELAy?
[:SENSe]:SWEep:EGATE:EXTErnal[1]|2:LEVEl <voltage>
[:SENSe]:SWEep:EGATE:EXTErnal[1]|2:LEVEl?
[:SENSe]:SWEep:EGATE:LENGth <time>
[:SENSe]:SWEep:EGATE:LENGth?
[:SENSe]:SWEep:EGATE:POLarity NEGative | POSitive
[:SENSe]:SWEep:EGATE:POLarity?
[:SENSe]:SWEep:EGATE:SOURce EXTErnal1 | EXTErnal2 | LINE | FRAME | RFBurst
[:SENSe]:SWEep:EGATE:SOURce?
[:SENSe]:SWEep:EGATE[:STATE] OFF | ON | 0 | 1
[:SENSe]:SWEep:EGATE[:STATE]?
[:SENSe]:SWEep:EGATE:TIME <time>
[:SENSe]:SWEep:EGATE:TIME?
[:SENSe]:SWEep:EGATE:VIEW ON | OFF | 1 | 0
[:SENSe]:SWEep:EGATE:VIEW?
[:SENSe]:SWEep:EGATE:VIEW:STARt <time>
[:SENSe]:SWEep:EGATE:VIEW:STARt?
[:SENSe]:SWEep:TIME:GATE:LEVEl HIGH | LOW
[:SENSe]:SWEep:TIME:GATE:LEVEl?
[:SENSe]:WAVEform:APERture?
[:SENSe]:WAVEform:AVERage:COUNt <integer>
[:SENSe]:WAVEform:AVERage:COUNt?
[:SENSe]:WAVEform:AVERage[:STATE] OFF | ON | 0 | 1
[:SENSe]:WAVEform:AVERage[:STATE]?
[:SENSe]:WAVEform:AVERage:TCONtrol EXPonential | REPEat
[:SENSe]:WAVEform:AVERage:TCONtrol?
[:SENSe]:WAVEform:AVERage:TYPE LOG | RMS | SCALar
[:SENSe]:WAVEform:AVERage:TYPE?
[:SENSe]:WAVEform:AVERage:TYPE:AUTO[:STATE] ON | OFF | 1 | 0
[:SENSe]:WAVEform:AVERage:TYPE:AUTO[:STATE]?
[:SENSe]:WAVEform:BANDwidth|BWIDth[:RESolution]:TYPE
[:SENSe]:WAVEform:BANDwidth[:RESolution]
[:SENSe]:WAVEform:BANDwidth:SHAPE
[:SENSe]:WAVEform:BWIDth[:RESolution]
[:SENSe]:WAVEform:BWIDth:SHAPE
[:SENSe]:WAVEform:DIF:BANDwidth <freq>
[:SENSe]:WAVEform:DIF:BANDwidth?
[:SENSe]:WAVEform:DIF:FILTer:ALPHA <real>
[:SENSe]:WAVEform:DIF:FILTer:ALPHA?
[:SENSe]:WAVEform:DIF:FILTer:BANDwidth <freq>
[:SENSe]:WAVEform:DIF:FILTer:BANDwidth?
[:SENSe]:WAVEform:DIF:FILTer:BANDwidth:AUTO ON | OFF | 1 | 0
[:SENSe]:WAVEform:DIF:FILTer:BANDwidth:AUTO?
[:SENSe]:WAVEform:DIF:FILTer:TYPE GAUSSian | FLATtop | SNYQuist |
RSNYquist | RCOSine | RRCosine
[:SENSe]:WAVEform:DIF:FILTer:TYPE GAUSSian | FLATtop
[:SENSe]:WAVEform:DIF:FILTer:TYPE?
[:SENSe]:WAVEform:DIF:FILTer:TYPE?
[:SENSe]:WAVEform:SRATE <freq>
[:SENSe]:WAVEform:SRATE?
[:SENSe]:WAVEform:SWEep:TIME <time>

```

```
[ :SENSe ] :WAVeform:SWEEp:TIME?
[ :SENSe ] :WAVeform:WBIF:FILTEr:ALPHa
SOURce:AM[:DEPTh][:LINear]
SOURce:AM[:DEPTh][:LINear]?
SOURce:AM:INTernal:FREQuency
SOURce:AM:INTernal:FREQuency?
SOURce:AM:STATe
SOURce:AM:STATe?
SOURce:FM[:DEViation]
SOURce:FM[:DEViation]?
SOURce:FM:INTernal:FREQuency
SOURce:FM:INTernal:FREQuency?
SOURce:FM:STATe
SOURce:FM:STATe?
SOURce:FREQuency:CHANnels:BAND NONE | PGSM | EGSM | RGSM | DCS1800 |
PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX |
BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN |
KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT |
PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | BAND1 | BAND2 | BAND3 |
BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13
| BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 |
BAND26 | BAND27 | BAND28 | BAND29 | BAND30 | BAND31 | BAND33 | BAND34 |
BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 | BAND41 | BAND42 |
BAND43 | BAND44 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDF
SOURce:FREQuency:CHANnels:BAND?
SOURce:FREQuency:CHANnels:NUMBER <int>
SOURce:FREQuency:CHANnels:NUMBER?
SOURce:FREQuency[:CW] <freq>
SOURce:FREQuency[:CW]?
SOURce:FREQuency:OFFSet <freq>
SOURce:FREQuency:OFFSet?
SOURce:FREQuency:REFerence <freq>
SOURce:FREQuency:REFerence?
SOURce:FREQuency:REFerence:SET
SOURce:FREQuency:REFerence:STATe OFF | ON | 0 | 1
SOURce:FREQuency:REFerence:STATe?
SOURce:LIST:INITiation:ARMed?
SOURce:LIST:NUMBER:STEPS <integer>
SOURce:LIST:NUMBER:STEPS?
SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ...
SOURce:LIST:SETup:AMPLitude?
SOURce:LIST:SETup:CLEar
SOURce:LIST:SETup:CNFFrequency <double>, <double>, <double>, ...
SOURce:LIST:SETup:CNFFrequency?
SOURce:LIST:SETup:DURATION:TYPE <enum>, <enum>, <enum>, ...
SOURce:LIST:SETup:DURATION:TYPE?
SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ...
SOURce:LIST:SETup:INPut:TRIGger?
SOURce:LIST:SETup:OUTPut:TRIGger ?
SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
```

```

SOURCE:LIST:SETup:RADio:BAND?
SOURCE:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ...
SOURCE:LIST:SETup:RADio:BAND:LINK?
SOURCE:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
SOURCE:LIST:SETup:TOCount?
SOURCE:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ...
SOURCE:LIST:SETup:TRANSition:TIME?
SOURCE:LIST:SETup:WAVeform <string>, <string>, <string>, ...
SOURCE:LIST:SETup:WAVeform?
SOURCE:LIST[:STATE] ON | OFF | 1 | 0
SOURCE:LIST[:STATE]?
SOURCE:LIST:STEP[1]|2|...|4..1000:SETup IMMEdiate | INTernal | KEY | BUS |
EXTernal2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900 | TGSM810
| GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII | BANDIII | BANDIV |
BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX | BANDXI | BANDXII |
BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN | KOREAN | NMT |
IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT | PCS1DOT9G | AWS |
US2DOT5G | PUBLIC | LOWER | NONE | BAND1 | BAND2 | BAND3 | BAND4 | BAND5 |
BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13 | BAND14 |
BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 | BAND26 |
BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 |
BAND41 | BAND42 | BAND43 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDE,
DOWN | UP, <freq>, <ampl>, <string>, TIME | COUNT | CONTinuous, <time>, ON
| OFF | 1 | 0, [<int>],
SOURCE:LIST:STEP[1]|2|...|4..1000:SETup?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:AMPLitude <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:AMPLitude?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TCOUNT <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TCOUNT?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TYPE TIME | COUNT |
CONTinuous | CABort
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TYPE?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:INPut:TRIGger IMMEdiate | INTernal |
EXTernal2 | KEY | BUS | EXTernal4
SOURCE:LIST:STEP[1]|2|3..1000:SETup:INPut:TRIGger?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:OUTPut:TRIGger ON | OFF | 1 | 0
SOURCE:LIST:STEP[1]|2|3..1000:SETup:OUTPut:TRIGger
SOURCE:LIST:STEP[1]|2|3..1000:SETup:RADio:BAND NONE | PGSM | EGSM | RGSM
| DCS1800 | PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI
| BANDII | BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX
| BANDX | BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS
| JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 |
BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 |
BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 | BAND31 |
BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 |

```

3 Programming the Test Set

List of SCPI Commands

```
BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC | BANDD | BANDE
| BANDF
SOURCE:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND?
SOURCE:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK DOWN | UP
SOURCE:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK?
SOURCE:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME <time>
SOURCE:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME?
SOURCE:LIST:STEP[1]|2|3...1000:SETup:WAVEform <string>
SOURCE:LIST:STEP[1]|2|3...1000:SETup:WAVEform?
SOURCE:LIST:TRIGger[:IMMediate]
SOURCE:LIST:TRIGger:INITiate[:IMMediate]
SOURCE:LIST:TRIGgerout:TYPE BEGinningofstep | DATamarker
SOURCE:PM[:DEVIation]
SOURCE:PM[:DEVIation]?
SOURCE:PM:INTernal:FREQuency
SOURCE:PM:INTernal:FREQuency?
SOURCE:PM:STATE
SOURCE:PM:STATE?
SOURCE:POWER[:LEVEL][:IMMediate][:AMPLitude] <ampl>
SOURCE:POWER[:LEVEL][:IMMediate][:AMPLitude]?
SOURCE:POWER[:LEVEL][:IMMediate]:OFFSet <rel_ampl>
SOURCE:POWER[:LEVEL][:IMMediate]:OFFSet?
SOURCE:POWER:REFerence <ampl>
SOURCE:POWER:REFerence?
SOURCE:POWER:REFerence:STATE OFF | ON | 0 | 1
SOURCE:POWER:REFerence:STATE?
SOURCE:PRESet
SOURCE:RADio:ARB:BASEband:FREQuency:OFFSet <freq>
SOURCE:RADio:ARB:BASEband:FREQuency:OFFSet?
SOURCE:RADio:ARB:CATalog?
SOURCE:RADio:ARB:DEFault:DIRectory <string>
SOURCE:RADio:ARB:DEFault:DIRectory?
SOURCE:RADio:ARB:DELeTe <string>
SOURCE:RADio:ARB:DELeTe:ALL
SOURCE:RADio:ARB:FCATalog?
SOURCE:RADio:ARB:HEADer:CLEAr
SOURCE:RADio:ARB:HEADer:SAVE
SOURCE:RADio:ARB:LOAD <string>
SOURCE:RADio:ARB:LOAD:ALL <string>
SOURCE:RADio:ARB:MDESTination:ALCHold NONE | M1 | M2 | M3 | M4
SOURCE:RADio:ARB:MDESTination:ALCHold?
SOURCE:RADio:ARB:MDESTination:PULSe NONE | M1 | M2 | M3 | M4
SOURCE:RADio:ARB:MDESTination:PULSe?
SOURCE:RADio:ARB:MPLicensed:NAME:LOCKed?
SOURCE:RADio:ARB:MPLicensed:UID:LOCKed?
SOURCE:RADio:ARB:MPOLarity:MARKer4 POSitive | NEGative
SOURCE:RADio:ARB:MPOLarity:MARKer2 POSitive | NEGative
SOURCE:RADio:ARB:MPOLarity:MARKer1 POSitive | NEGative
SOURCE:RADio:ARB:MPOLarity:MARKer3 POSitive | NEGative
SOURCE:RADio:ARB:MPOLarity:MARKer1?
SOURCE:RADio:ARB:MPOLarity:MARKer3?
SOURCE:RADio:ARB:MPOLarity:MARKer4?
SOURCE:RADio:ARB:MPOLarity:MARKer2?
```

```

SOURCE:RADio:ARB:NOISe:BANDwidth <freq>
SOURCE:RADio:ARB:NOISe:BANDwidth?
SOURCE:RADio:ARB:NOISe:CBwidth <freq>
SOURCE:RADio:ARB:NOISe:CBwidth?
SOURCE:RADio:ARB:NOISe:CN <ampl>
SOURCE:RADio:ARB:NOISe:CN?
SOURCE:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTA | CARRier | NOISe |
NCHannel
SOURCE:RADio:ARB:NOISe:POWer:CONTRol[:MODE]?
SOURCE:RADio:ARB:NOISe[:STATe] ON | OFF | 1 | 0
SOURCE:RADio:ARB:NOISe[:STATe]?
SOURCE:RADio:ARB:RETRigger ON | OFF | IMMEDIATE
SOURCE:RADio:ARB:RETRigger?
SOURCE:RADio:ARB:RMS <float>
SOURCE:RADio:ARB:RMS?
SOURCE:RADio:ARB:RMS:CALCulate
SOURCE:RADio:ARB:RMS:CALCulation:MODE AUTO | M1 | M2 | M3 | M4
SOURCE:RADio:ARB:RMS:CALCulation:MODE?
SOURCE:RADio:ARB:RSCaling <real>
SOURCE:RADio:ARB:RSCaling?
SOURCE:RADio:ARB:SCLock:RATE <freq>
SOURCE:RADio:ARB:SCLock:RATE?
SOURCE:RADio:ARB:SEQUence[:MWAVEform] <filename>, <waveform1>, <reps>,
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>,
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, }...
SOURCE:RADio:ARB:SEQUence[:MWAVEform]? <filename>
SOURCE:RADio:ARB[:STATe] ON | OFF | 1 | 0
SOURCE:RADio:ARB[:STATe]?
SOURCE:RADio:ARB:TRIGger:INITiate
SOURCE:RADio:ARB:TRIGger[:SOURce] KEY | BUS | EXTERNAL2
SOURCE:RADio:ARB:TRIGger[:SOURce]?
SOURCE:RADio:ARB:TRIGger:TYPE CONTinuous | SINGLE | SADVance
SOURCE:RADio:ARB:TRIGger:TYPE?
SOURCE:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE | TRIGger | RESet
SOURCE:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
SOURCE:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE | CONTinuous
SOURCE:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
SOURCE:RADio:ARB:WAVEform <string>
SOURCE:RADio:ARB:WAVEform?
SOURCE:RADio:BAND:LINK DOWN | UP
SOURCE:RADio:BAND:LINK?
SOURCE:RADio:DEvIce BTS | MS
SOURCE:RADio:DEvIce?
STATus:OPERation:CONDition?
STATus:OPERation:ENABle <integer>
STATus:OPERation:ENABle?
STATus:OPERation[:EVENT]?
STATus:OPERation:NTRansition <integer>
STATus:OPERation:NTRansition?
STATus:OPERation:PTRansition <integer>

```

STATus:OPERation:PTRansition?
STATus:PRESet
STATus:QUEStionable:CALibration:CONDition?
STATus:QUEStionable:CALibration:ENABle <integer>
STATus:QUEStionable:CALibration:ENABle?
STATus:QUEStionable:CALibration[:EVENT]?
STATus:QUEStionable:CALibration:NTRansition <integer>
STATus:QUEStionable:CALibration:NTRansition?
STATus:QUEStionable:CALibration:PTRansition <integer>
STATus:QUEStionable:CALibration:PTRansition?
STATus:QUEStionable:CONDition?
STATus:QUEStionable:ENABle <integer>
STATus:QUEStionable:ENABle?
STATus:QUEStionable[:EVENT]?
STATus:QUEStionable:FREQuency:CONDition?
STATus:QUEStionable:FREQuency:ENABle <integer>
STATus:QUEStionable:FREQuency:ENABle?
STATus:QUEStionable:FREQuency[:EVENT]?
STATus:QUEStionable:FREQuency:NTRansition <integer>
STATus:QUEStionable:FREQuency:NTRansition?
STATus:QUEStionable:FREQuency:PTRansition <integer>
STATus:QUEStionable:FREQuency:PTRansition?
STATus:QUEStionable:INTEgrity:CONDition?
STATus:QUEStionable:INTEgrity:ENABle <integer>
STATus:QUEStionable:INTEgrity:ENABle?
STATus:QUEStionable:INTEgrity[:EVENT]?
STATus:QUEStionable:INTEgrity:NTRansition <integer>
STATus:QUEStionable:INTEgrity:NTRansition?
STATus:QUEStionable:INTEgrity:PTRansition <integer>
STATus:QUEStionable:INTEgrity:PTRansition?
STATus:QUEStionable:NTRansition <integer>
STATus:QUEStionable:NTRansition?
STATus:QUEStionable:POWer:CONDition?
STATus:QUEStionable:POWer:ENABle <integer>
STATus:QUEStionable:POWer:ENABle?
STATus:QUEStionable:POWer[:EVENT]?
STATus:QUEStionable:POWer:NTRansition <integer>
STATus:QUEStionable:POWer:NTRansition?
STATus:QUEStionable:POWer:PTRansition <integer>
STATus:QUEStionable:POWer:PTRansition?>
STATus:QUEStionable:PTRansition <integer>
STATus:QUEStionable:PTRansition?
STATus:QUEStionable:TEMPerature:CONDition?
STATus:QUEStionable:TEMPerature:ENABle <integer>
STATus:QUEStionable:TEMPerature:ENABle?
STATus:QUEStionable:TEMPerature[:EVENT]?
STATus:QUEStionable:TEMPerature:NTRansition <integer>
STATus:QUEStionable:TEMPerature:NTRansition?
STATus:QUEStionable:TEMPerature:PTRansition <integer>
STATus:QUEStionable:TEMPerature:PTRansition?
SYSTem:APPLication:CATalog[:NAME]?
SYSTem:APPLication:CATalog[:NAME]:COUNT?
SYSTem:APPLication:CATalog:OPTion? <model>


```

SYSTEM:APPLication:CATalog:REVisIon? <model>
SYSTEM:APPLication[:CURRent][:NAME]?
SYSTEM:APPLication[:CURRent]:OPTion?
SYSTEM:APPLication[:CURRent]:REVisIon?
SYSTEM:COMMunicate:ANALyzer:ADD[:IPAddress] <addressstring>
SYSTEM:COMMunicate:ANALyzer:DELeTe:ALL
SYSTEM:COMMunicate:ANALyzer:DELeTe[:IPAddress] <addressstring>
SYSTEM:COMMunicate:ANALyzer:RELease
SYSTEM:COMMunicate:ANALyzer:SELeCt[:IPAddress] <addressstring>
SYSTEM:COMMunicate:ANALyzer:SELeCt[:IPAddress]?
SYSTEM:COMMunicate:ANALyzer:VERify <addressstring>
SYSTEM:COMMunicate:LAN:SCPI:HISLip:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:HISLip:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:SICL:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:SICL:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:SOCKeT:CONTRol?
SYSTEM:COMMunicate:LAN:SCPI:SOCKeT:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:SOCKeT:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:TELNet:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:TELNet:ENABle?
SYSTEM:CONFigure[:SYSTEM]?
SYSTEM:CSYSTEM?
SYSTEM:DATE "<year>, <month>, <day>"
SYSTEM:DATE?
SYSTEM:DEFault [ALL] | ALIGn | INPut | MISC | MODes | PON
SYSTEM:ERRor[:NEXT]?
SYSTEM:ERRor:OVERload[:STATE] 0 | 1 | OFF | ON
SYSTEM:ERRor:PUP?
SYSTEM:ERRor:VERBoSe OFF | ON | 0 | 1
SYSTEM:ERRor:VERBoSe?
SYSTEM:HELP:HEADers?
SYSTEM:HID?
SYSTEM:IDN <string>
SYSTEM:IDN?
SYSTEM:KLOCK OFF | ON | 0 | 1
SYSTEM:KLOCK?
SYSTEM:LIcense[:FPACK]:WAVEform:ADD <string>
SYSTEM:LIcense[:FPACK]:WAVEform:CLEar <int>
SYSTEM:LIcense[:FPACK]:WAVEform:FREE?
SYSTEM:LIcense[:FPACK]:WAVEform:LOCK <int>
SYSTEM:LIcense[:FPACK]:WAVEform:NAME? <int>
SYSTEM:LIcense[:FPACK]:WAVEform:REPLace <int>, <string>
SYSTEM:LIcense[:FPACK]:WAVEform:STATus? <int>
SYSTEM:LIcense[:FPACK]:WAVEform:UID? <int>
SYSTEM:LIcense[:FPACK]:WAVEform:USED?
SYSTEM:LKEY <"OptionInfo">, <"LicenseInfo">
SYSTEM:LKEY? <"OptionInfo">
SYSTEM:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo">
SYSTEM:LKEY:LIST?
SYSTEM:LKEY:WAVEform:ADD <string>
SYSTEM:LKEY:WAVEform:CLEar <int>
SYSTEM:LKEY:WAVEform:FREE?
SYSTEM:LKEY:WAVEform:LOCK <int>

```

3 Programming the Test Set

List of SCPI Commands

```
SYSTem:LKEY:WAVeform:NAME? <int>
SYSTem:LKEY:WAVeform:REPLace <int>, <string>
SYSTem:LKEY:WAVeform:STATUs? <int>
SYSTem:LKEY:WAVeform:UID? <int>
SYSTem:LKEY:WAVeform:USED?
SYSTem:MODule:DEFault "<mnemonic>"
SYSTem:MODule:DEFault?
SYSTem:MODule:ENABLe "<mnemonic>", 0 | 1
SYSTem:MODule:ENABLe? "<mnemonic>"
SYSTem:MODule:INDex?
SYSTem:MODule:LIST?
SYSTem:MODule:MNEMonic?
SYSTem:MODule:MODEl?
SYSTem:MODule:NAME?
SYSTem:MODule:SERial?
SYSTem:OPTions?
SYSTem:PDOWN [NORMAL | FORCe]
SYSTem:PON:APPLication:LLIST <stringofINSTrument:SElectnames>
SYSTem:PON:APPLication:LLIST?
SYSTem:PON:APPLication:VMEMory[:AVAIlable]?
SYSTem:PON:APPLication:VMEMory:TOTAL?
SYSTem:PON:APPLication:VMEMory:USED?
SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SElectname>
SYSTem:PON:MODE SA | BASIC | ADEMOD | NFIGURE | PNOISE | CDMA2K | TDSCDMA
| VSA | VSA89601 | WCDMA | WIMAXOFDMA
SYSTem:PON:MODE?
SYSTem:PON:TIME?
SYSTem:PON:TYPE MODE | USER | LAST
SYSTem:PON:TYPE PRESet
SYSTem:PON:TYPE?
SYSTem:PRESet
SYSTem:PRESet:TYPE FACTory | MODE | USER
SYSTem:PRESet:TYPE?
SYSTem:PRESet:USER
SYSTem:PRESet:USER:ALL
SYSTem:PRESet:USER:SAVE
SYSTem:PRINt:THEME TDColor | TDMonochrome | FCOLor | FMONochrome
SYSTem:PRINt:THEMe?
SYSTem:PUP:PROcEss
SYSTem:SECurity:USB:WPRotect[:ENABLe] ON | OFF | 0 | 1
SYSTem:SECurity:USB:WPRotect[:ENABLe]?
SYSTem:SHOW OFF | ERRor | SYSTem | HARDware | LXI | HWSTATistics |
ALIGNment | SOFTware | CAPplication
SYSTem:SHOW?
SYSTem:TEST:WCTS:[ALL]
SYSTem:TEST:WCTS:FEC
SYSTem:TEST:WCTS:FEC:RESult?
SYSTem:TEST:WCTS:SHOW:RESult FEC
SYSTem:TIME "<hour>, <minute>, <second>"
SYSTem:TIME?
SYSTem:VERSion?
TRACe:CHPower:TYPE WRITe | AVERAge | MAXHold | MINHold
TRACe:CHPower:TYPE?
```

```

TRACe:OBWidth:TYPE WRITe | AVERAge | MAXHold | MINHold
TRACe:OBWidth:TYPE?
TRACe:SEMask:TYPE WRITe | AVERAge | MAXHold | MINHold
TRACe:SEMask:TYPE?
TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTernal1 | EXTernal2 |
IMMediate | IQMag | IDEMod | QDEMod | IINPut | QINPut | AIQMag
TRIGger:<measurement>[:SEQuence]:IQ:SOURce?
TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1 | EXTernal2 |
IMMediate | LINE | FRAME | RFBurst | VIDEo | IF | ALARm | LAN | TV
TRIGger:<measurement>[:SEQuence]:RF:SOURce?
TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1 | EXTernal2 | IMMediate
| LINE | FRAME | RFBurst | VIDEo | IF | ALARm | LAN | IQMag | IDEMod |
QDEMod | IINPut | QINPut | AIQMag | TV
TRIGger:<measurement>[:SEQuence]:SOURce?
TRIGger[:SEQuence]:ATRigger <time>
TRIGger[:SEQuence]:ATRigger?
TRIGger[:SEQuence]:ATRigger:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:ATRigger:STATe?
TRIGger[:SEQuence]:DELay <time>
TRIGger[:SEQuence]:DELay?
TRIGger[:SEQuence]:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:DELay:STATe?
TRIGger[:SEQuence]:EXTernal1:DELay <time>
TRIGger[:SEQuence]:EXTernal2:DELay <time>
TRIGger[:SEQuence]:EXTernal:DELay
TRIGger[:SEQuence]:EXTernal2:DELay?
TRIGger[:SEQuence]:EXTernal1:DELay?
TRIGger[:SEQuence]:EXTernal2:DELay:COMPensation OFF | ON | 0 | 1
TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation OFF | ON | 0 | 1
TRIGger[:SEQuence]:EXTernal2:DELay:COMPensation?
TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation?
TRIGger[:SEQuence]:EXTernal1:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:EXTernal1:DELay:STATe?
TRIGger[:SEQuence]:EXTernal2:DELay:STATe?
TRIGger[:SEQuence]:EXTernal:LEVel
TRIGger[:SEQuence]:EXTernal1:LEVel <level>
TRIGger[:SEQuence]:EXTernal2:LEVel
TRIGger[:SEQuence]:EXTernal1:LEVel?
TRIGger[:SEQuence]:EXTernal2:LEVel?
TRIGger[:SEQuence]:EXTernal:SLOPe
TRIGger[:SEQuence]:EXTernal1:SLOPe POSitive | NEGative
TRIGger[:SEQuence]:EXTernal2:SLOPe POSitive | NEGative
TRIGger[:SEQuence]:EXTernal1:SLOPe?
TRIGger[:SEQuence]:EXTernal2:SLOPe?
TRIGger[:SEQuence]:FRAME:ADJust <time>
TRIGger[:SEQuence]:FRAME:DELay <time>
TRIGger[:SEQuence]:FRAME:DELay?
TRIGger[:SEQuence]:FRAME:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:FRAME:DELay:STATe?
TRIGger[:SEQuence]:FRAME:EXTernal1:LEVel
TRIGger[:SEQuence]:FRAME:EXTernal2:LEVel

```

3 Programming the Test Set

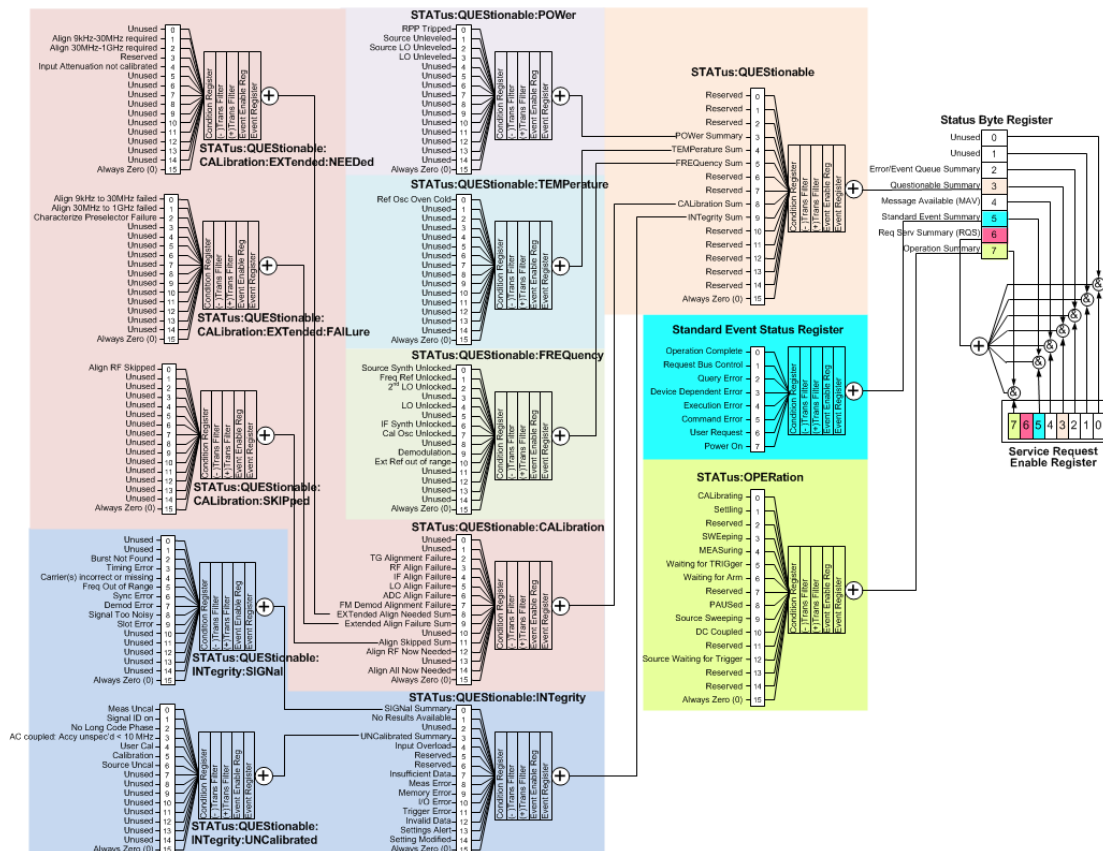
List of SCPI Commands

```
TRIGger[:SEquence]:FRAME:EXTErnal2:SLOPe
TRIGger[:SEquence]:FRAME:EXTErnal1:SLOPe
TRIGger[:SEquence]:FRAME:OFFSet <time>
TRIGger[:SEquence]:FRAME:OFFSet?
TRIGger[:SEquence]:FRAME:OFFSet:DISPlay:RESet
TRIGger[:SEquence]:FRAME:PERiod <time>
TRIGger[:SEquence]:FRAME:PERiod?
TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute
TRIGger[:SEquence]:FRAME:RFBurst:SLOPe
TRIGger[:SEquence]:FRAME:SYNC EXTErnal1 | EXTErnal2 | RFBurst | OFF
TRIGger[:SEquence]:FRAME:SYNC EXTErnal
TRIGger[:SEquence]:FRAME:SYNC?
TRIGger[:SEquence]:FRAME:SYNC:HOLDOff <time>
TRIGger[:SEquence]:FRAME:SYNC:HOLDOff?
TRIGger[:SEquence]:FRAME:SYNC:HOLDOff:STATE OFF | ON | 0 | 1
TRIGger[:SEquence]:FRAME:SYNC:HOLDOff:STATE?
TRIGger[:SEquence]:HOLDOff <time>
TRIGger[:SEquence]:HOLDOff?
TRIGger[:SEquence]:HOLDOff:STATE OFF | ON | 0 | 1
TRIGger[:SEquence]:HOLDOff:STATE?
TRIGger[:SEquence]:HOLDOff:TYPE NORMAl | ABOVe | BELOw
TRIGger[:SEquence]:HOLDOff:TYPE?
TRIGger[:SEquence]:IF:LEVel
TRIGger[:SEquence]:IF:LEVel?
TRIGger[:SEquence]:IF:SLOPe NEGative | POSitive
TRIGger[:SEquence]:IF:SLOPe?
TRIGger[:SEquence]:OFFSet <time>
TRIGger[:SEquence]:OFFSet?
TRIGger[:SEquence]:OFFSet:STATE OFF | ON | 0 | 1
TRIGger[:SEquence]:OFFSet:STATE?
TRIGger[:SEquence]:RFBurst:DELAy <time>
TRIGger[:SEquence]:RFBurst:DELAy?
TRIGger[:SEquence]:RFBurst:DELAy:STATE OFF | ON | 0 | 1
TRIGger[:SEquence]:RFBurst:DELAy:STATE?
TRIGger[:SEquence]:RFBurst:LEVel
TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl>
TRIGger[:SEquence]:RFBurst:LEVel:ABSolute?
TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_ampl>
TRIGger[:SEquence]:RFBurst:LEVel:RELative?
TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute | RELative
TRIGger[:SEquence]:RFBurst:LEVel:TYPE?
TRIGger[:SEquence]:RFBurst:SLOPe POSitive | NEGative
TRIGger[:SEquence]:RFBurst:SLOPe?
TRIGger[:SEquence]:SLOPe POSitive | NEGative
TRIGger[:SEquence]:SLOPe?
TRIGger[:SEquence]:SOURCe EXTErnal
TRIGger[:SEquence]:VIDeo:DELAy <time>
TRIGger[:SEquence]:VIDeo:DELAy?
TRIGger[:SEquence]:VIDeo:DELAy:STATE OFF | ON | 0 | 1
TRIGger[:SEquence]:VIDeo:DELAy:STATE?
TRIGger[:SEquence]:VIDeo:LEVel <ampl>
TRIGger[:SEquence]:VIDeo:LEVel?
TRIGger[:SEquence]:VIDeo:SLOPe POSitive | NEGative
```

```
TRIGger[:SEquence]:VIDeo:SLOPe?  
TRIGger|TRIGger1|TRIGger2[:SEquence]:OUTPut HSWP | MEASuring | MAIN | GATE  
| GTRigger | OEVEN | SPOint | SSweep | SSETtled | S1Marker | S2Marker |  
S3Marker | S4Marker | OFF  
TRIGger|TRIGger1|TRIGger2[:SEquence]:OUTPut?  
TRIGger|TRIGger1|TRIGger2[:SEquence]:OUTPut:POLarity POSitive | NEGative  
TRIGger|TRIGger1|TRIGger2[:SEquence]:OUTPut:POLarity?  
UNIT:CHPower:POWER:PSD DBMHZ | DBMMHZ  
UNIT:CHPower:POWER:PSD?
```

STATus Subsystem

The following diagram shows the entire Status Register Subsystem implementation of the X Series instruments.



Detailed Description

The STATus subsystem remote commands set and query the status hardware registers. This system of registers monitors various events and conditions in the instrument. Software written to control the instrument may need to monitor some of these events and conditions.

NOTE

All status register commands are sequential. Most commands can be started immediately and will overlap with any existing commands that are already running. This is not true of status commands. All the commands in the spectrum analyzer are assumed to be overlapped unless a command description specifically says that it is sequential.

What Are Status Registers

The status system contains multiple registers that are arranged in a hierarchical order. The lower-level status registers propagate their data to the higher-level registers in the data structures by means of summary bits. The status byte register is at the top of the hierarchy and contains general status information for the instrument's events and conditions. All other individual registers are used to determine the specific events or conditions. For a diagram of the registers and their interconnections, see above.

The operation and questionable status registers are sets of registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. Each register set is made up of five registers:

- Condition Register—It reports the real-time state of the signals monitored by this register set. There is no latching or buffering for a condition register.
- Positive Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a low to high transition (when the condition bit changes from 0 to 1).
- Negative Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a high to low transition (when the condition bit changes from 1 to 0).
- Event Register—It latches any signal state changes, in the way specified by the filter registers. Bits in the event register are never cleared by signal state changes. Event registers are cleared when read. They are also cleared by *CLS and by presetting the instrument.
- Event Enable Register—It controls which of the bits, being set in the event register, will be summarized as a single output for the register set. Summary bits are then used by the next higher register.

The STATus:QUEStionable registers report abnormal operating conditions. The status register hierarchy is:

1. The summary outputs from the six STATus:QUEStionable:<keyword> detail registers are inputs to the STATus:QUEStionable register.
2. The summary output from the STATus:QUEStionable register is an input to the Status Byte Register. See the overall system in Figure at the beginning of this section.

The STATus:OPERation register set has no summarized inputs. The inputs to the STATus:OPERation:CONDition register indicate the real time state of the instrument. The STATus:OPERation:EVENT register summary output is an input to the Status Byte Register.

What Are Status Register SCPI Commands

Most monitoring of the instrument conditions is done at the highest level using the IEEE common commands indicated below. Complete command descriptions are available in the IEEE commands section at the beginning of the language reference. Individual status registers can be set and queried using the commands in the STATus subsystem of the language reference.

- *CLS (clear status) clears the status byte by emptying the error queue and clearing all the event registers.
- *ESE, *ESE? (event status enable) sets and queries the bits in the enable register part of the standard event status register.
- *ESR? (event status register) queries and clears the event register part of the standard event status register.
- *OPC, *OPC? (operation complete) sets the standard event status register to monitor the completion of all commands. The query stops any new commands from being processed until the current processing is complete, then returns a '1'.
- *PSC, *PSC? (power-on state clear) sets the power-on state so that it clears the service request enable register and the event status enable register at power on.
- *SRE, *SRE? (service request enable) sets and queries the value of the service request enable register.

- *STB? (status byte) queries the value of the status byte register without erasing its contents.

How to Use the Status Registers

A program often needs to be able to detect and manage error conditions or changes in instrument status. There are two methods you can use to programmatically access the information in status registers:

- The polling method
- The service request (SRQ) method

In the polling method, the instrument has a passive role. It only tells the controller that conditions have changed when the controller asks the right question. In the SRQ method, the instrument takes a more active role. It tells the controller when there has been a condition change without the controller asking. Either method allows you to monitor one or more conditions.

The polling method works well if you do not need to know about changes the moment they occur. The SRQ method should be used if you must know immediately when a condition changes. To detect a change using the polling method, the program must repeatedly read the registers.

Use the SRQ method when:

- you need time-critical notification of changes
- you are monitoring more than one device which supports SRQs
- you need to have the controller do something else while waiting
- you can't afford the performance penalty inherent to polling

Use polling when:

- your programming language/development environment does not support SRQ interrupts
- you want to write a simple, single-purpose program and don't want the added complexity of setting up an SRQ handler
- To monitor a condition:
 - a. Determine which register contains the bit that reports the condition.
 - b. Send the unique SCPI query that reads that register.
 - c. Examine the bit to see if the condition has changed.

You can monitor conditions in different ways.

- Check the current instrument hardware and firmware status.

Do this by querying the condition registers which continuously monitor status. These registers represent the current state of the instrument. Bits in a condition register are updated in real time. When the condition monitored by a particular bit becomes true, the bit is set to 1. When the condition becomes false, the bit is reset to 0.

- Monitor a particular condition (bit).

You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the

event register is cleared. Querying the event register allows you to detect that this condition occurred even if the condition no longer exists. The event register can only be cleared by querying it or sending the *CLS command.

- Monitor a particular type of change in a condition (bit).
 - The transition registers are preset to register if the condition goes from 0 to 1 (false to true, or a positive transition).
 - This can be changed so the selected condition is detected if the bit goes from 1 to 0 (true to false, or a negative transition).
 - It can also be set for both types of transitions occurring.
 - Or it can be set for neither transition. If both transition registers are set to 0 for a particular bit position, that bit will not be set in the event register for either type of change.

Using a Status Register

Each bit in a register is represented by a numerical value based on its location. See figure below. This number is sent with the command to enable a particular bit. If you want to enable more than one bit, you would send the sum of all the bits that you want to monitor.

Figure: Status Register Bit Values

| | | | | | | | | | | | | | | | | | | | | |
|----------------------|----|-------|-------|------|------|------|------|-----|-----|-----|----|----|----|---|---|---|---|--|--|--|
| Decimal Value | | | | | | | | | | | | | | | | | | | | |
| | | 32768 | 16384 | 8192 | 4096 | 2048 | 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | | |
| Bit Number | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | |

STATus:OPERation:ENABLE < num >
 STATus:OPERation:ENABLE?

Standard Operation Event Enable Register

ck730a

Bit 15 is not used to report status.

Example 1:

1. To enable bit 0 and bit 6 of standard event status register, you would send the command *ESE 65 because $1 + 64 = 65$.
2. The results of a query are evaluated in a similar way. If the *STB? command returns a decimal value of 140, ($140 = 128 + 8 + 4$) then bit 7 is true, bit 3 is true and bit 2 is true.

Example 2:

1. Suppose you want to know if an Auto-trigger Timeout occurs, but you only cared about that specific condition. So you would want to know what was happening with bit 10 in the Status Questionable Integrity register, and not about any other bits.
2. It's usually a good idea to start by clearing all the status registers with *CLS.

3. Sending the `STAT:QUES:INT:ENAB 1024` command lets you monitor only bit 10 events, instead of the default monitoring all the bits in the register. The register default is for positive transition events (0 to 1 transition). That is, when an auto-trigger timeout occurs. If instead, you wanted to know when the Auto-trigger timeout condition is cleared, then you would set the `STAT:QUES:INT:PTR 0` and the `STAT:QUES:INT:NTR 32767`.
4. So now the only output from the Status Questionable Integrity register will come from a bit 10 positive transition. That output goes to the Integrity Sum bit 9 of the Status Questionable register.
5. You can do a similar thing with this register to only look at bit 9 using, `STAT:QUES:ENAB 512`.
6. The Status Questionable register output goes to the “Status Questionable Summary” bit 3 of the Status Byte Register. The output from this register can be enabled using the `*SRE 8` command.
7. Finally, you would use the serial polling functionality available for the particular bus/software that you are using to monitor the Status Byte Register. (You could also use `*STB?` to poll the Status Byte Register.)

Using the Service Request (SRQ) Method

Your language, bus, and programming environment must be able to support SRQ interrupts. (For example, BASIC used with VXI-11.3 (GPIB over LAN). When you monitor a condition with the SRQ method, you must:

1. Determine which bit monitors the condition.
2. Determine how that bit reports to the request service (RQS) bit of the status byte.
3. Send SCPI commands to enable the bit that monitors the condition and to enable the summary bits that report the condition to the RQS bit.
4. Enable the controller to respond to service requests.

When the condition changes, the instrument sets its RQS bit. The controller is informed of the change as soon as it occurs. As a result, the time the controller would otherwise have used to monitor the condition can be used to perform other tasks. Your program determines how the controller responds to the SRQ.

Generating a Service Request

To use the SRQ method, you must understand how service requests are generated. Bit 6 of the status byte register is the request service (RQS) bit. The `*SRE` command is used to configure the RQS bit to report changes in instrument status. When such a change occurs, the RQS bit is set. It is cleared when the status byte register is queried using `*SRE?` (with a serial poll.) It can be queried without erasing the contents with `*STB?`.

When a register set causes a summary bit in the status byte to change from 0 to 1, the instrument can initiate the service request (SRQ) process. However, the process is only initiated if both of the following conditions are true:

- The corresponding bit of the service request enable register is also set to 1.
- The instrument does not have a service request pending. (A service request is considered to be pending between the time the instrument’s SRQ process is initiated and the time the controller reads the status byte register.)

The SRQ process sets the SRQ true. It also sets the status byte's request service (RQS) bit to 1. Both actions are necessary to inform the controller that the instrument requires service. Setting the SRQ line only informs the controller that some device on the bus requires service. Setting the RQS bit allows the controller to determine which instrument requires service.

If your program enables the controller to detect and respond to service requests, it should instruct the controller to perform a serial poll when the SRQ is set true. Each device on the bus returns the contents of its status byte register in response to this poll. The device who's RQS bit is set to 1 is the device that requested service.

When you read the instrument's status byte register with a serial poll, the RQS bit is reset to 0. Other bits in the register are not affected.

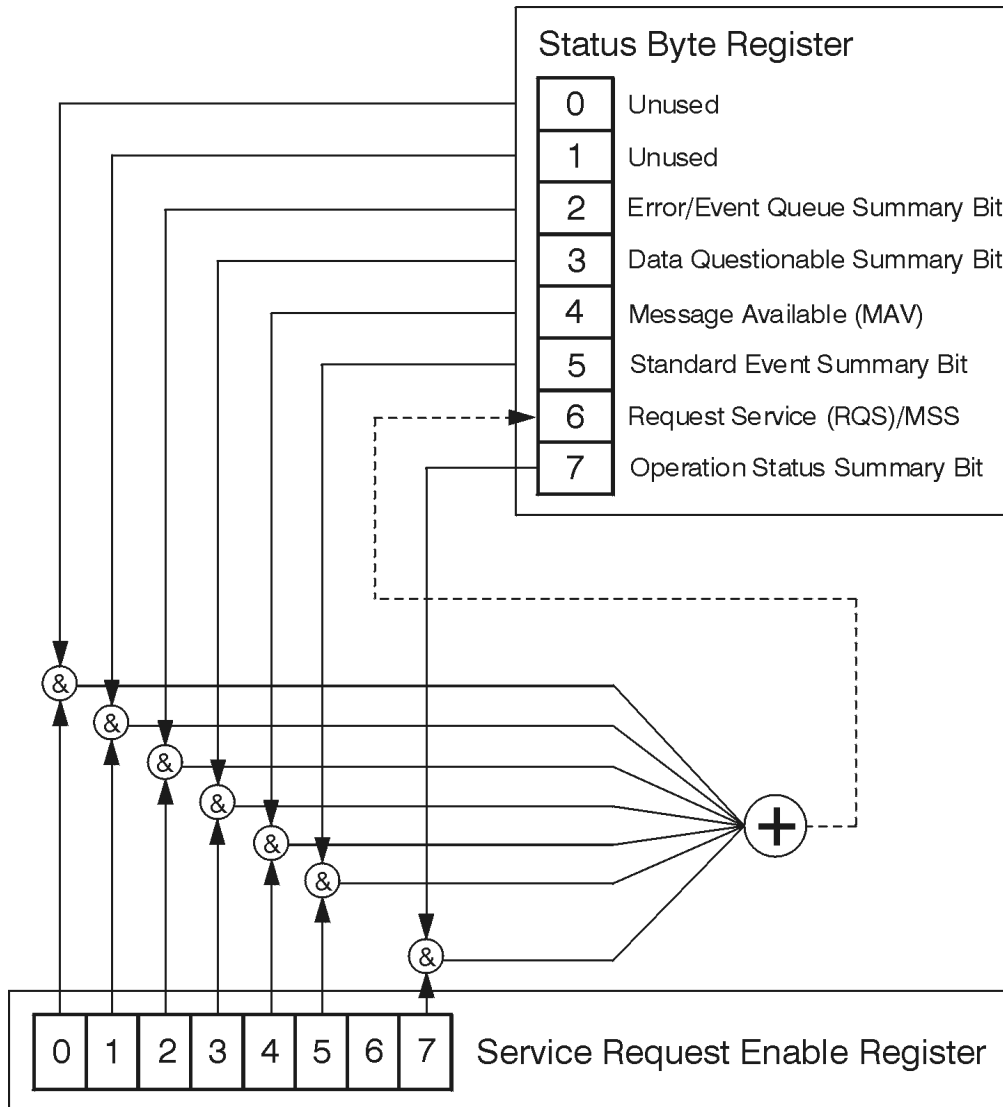
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

1. Set INITiate:CONTinuous off.
2. Set/enable the status registers.
3. Restart the measurement (send INIT).

Status Register System

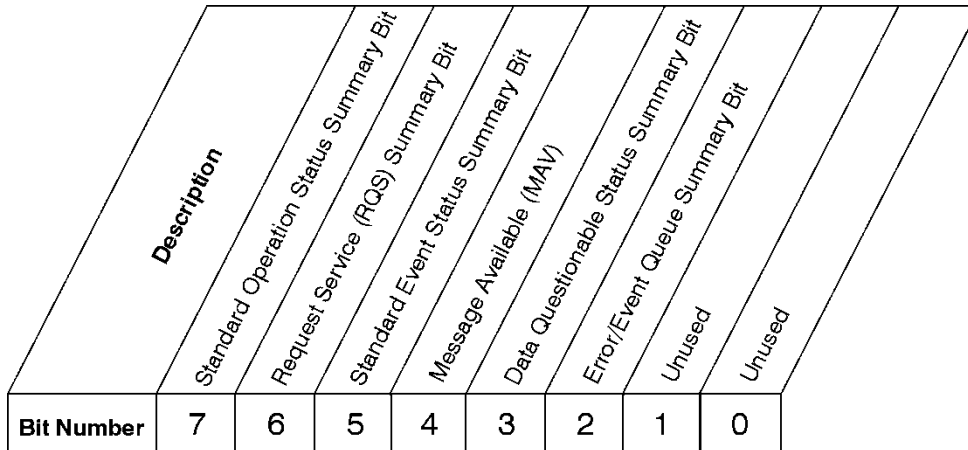
The hardware status registers are combined to form the instrument status system. Specific status bits are assigned to monitor various aspects of the instrument operation and status. See the diagram of the status system above for information about the bit assignments and status register interconnections.

The Status Byte Register



ck776a

The RQS bit is read and reset by a serial poll. The same bit position (MSS) is read, non-destructively by the *STB? command. If you serial poll bit 6 it is read as RQS, but if you send *STB it reads bit 6 as MSS. For more information refer to IEEE 488.2 standards, section 11.



*STB?

Status Byte Register

ck725a

| Bit | Description |
|------|---|
| 0, 1 | These bits are always set to 0. |
| 2 | A 1 in this bit position indicates that the SCPI error queue is not empty which means that it contains at least one error message. |
| 3 | A 1 in this bit position indicates that the data questionable summary bit has been set. The data questionable event register can then be read to determine the specific condition that caused this bit to be set. |
| 4 | A 1 in this bit position indicates that the instrument has data ready in the output queue. There are no lower status groups that provide input to this bit. |
| 5 | A 1 in this bit position indicates that the standard event summary bit has been set. The standard event status register can then be read to determine the specific event that caused this bit to be set. |
| 6 | A 1 in this bit position indicates that the instrument has at least one reason to report a status change. This bit is also called the master summary status bit (MSS). |
| 7 | A 1 in this bit position indicates that the standard operation summary bit has been set. The standard operation event register can then be read to determine the specific condition that caused this bit to be set. |

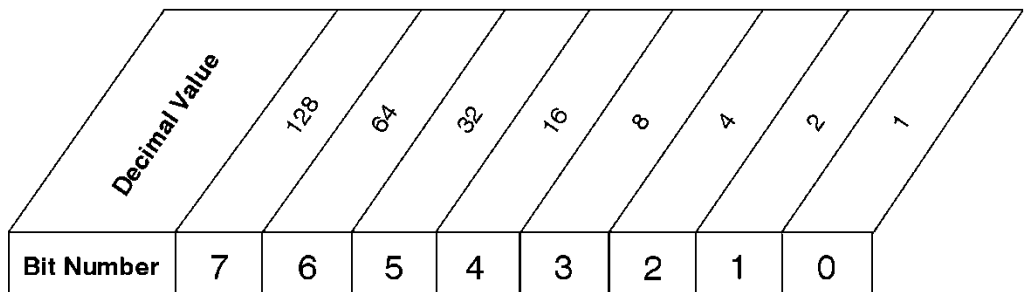
To query the status byte register, send the command *STB?. The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The *STB command does not clear the status register.

In addition to the status byte register, the status byte group also contains the service request enable register. This register lets you choose which bits in the status byte register will trigger a service request.

Send the *SRE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable plus the decimal value of bit 6. For example, assume that you want to enable bit 7 so that whenever the standard operation status register summary bit is set to 1 it will trigger a service request. Send the command *SRE 192 (because 192 = 128 + 64). You must always add 64 (the numeric value of RQS

bit 6) to your numeric sum when you enable any bits for a service request. The command *SRE? returns the decimal value of the sum of the bits previously enabled with the *SRE <integer> command.

The service request enable register presets to zeros (0).

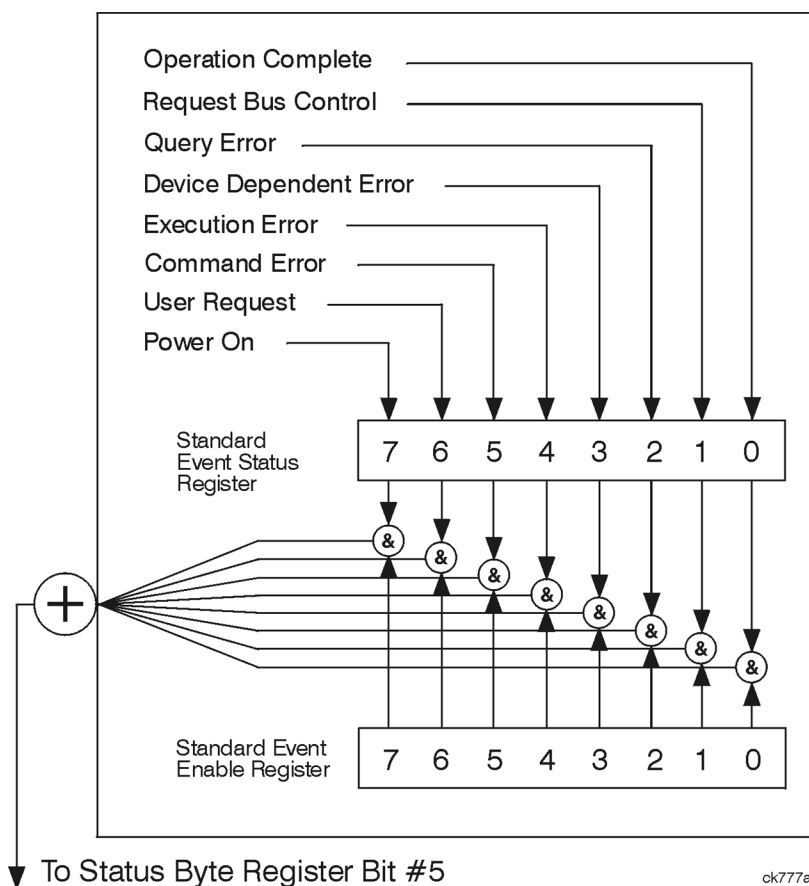


*SRE <num>
 *SRE?

Service Request Enable Register

ck726a

Standard Event Status Register



ck777a

The standard event status register contains the following bits:

| | | | | | | | | |
|--------------------|----------|--------------------------|---------------|-----------------|------------------------|-------------|-----------------|--------------------|
| Description | | | | | | | | |
| | Power On | User Request Key (Local) | Command Error | Execution Error | Device Dependent Error | Query Error | Request Control | Operation Complete |
| Bit Number | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

*ESR?

Standard Event Status Register

ck727a

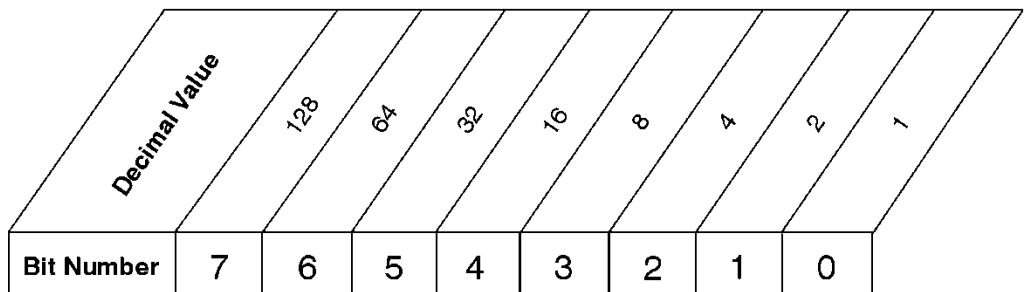
| Bit | Description |
|-----|---|
| 0 | A 1 in this bit position indicates that all pending operations were completed following execution of the *OPC command. |
| 1 | This bit is for GPIB handshaking to request control. Currently it is set to 0 because there are no implementations where the spectrum analyzer controls another instrument. |
| 2 | A 1 in this bit position indicates that a query error has occurred. Query errors have SCPI error numbers from -499 to -400. |
| 3 | A 1 in this bit position indicates that a device dependent error has occurred. Device dependent errors have SCPI error numbers from -399 to -300 and 1 to 32767. |
| 4 | A 1 in this bit position indicates that an execution error has occurred. Execution errors have SCPI error numbers from -299 to -200. |
| 5 | A 1 in this bit position indicates that a command error has occurred. Command errors have SCPI error numbers from -199 to -100. |
| 6 | A 1 in this bit position indicates that the LOCAL key has been pressed. This is true even if the instrument is in local lockout mode. |
| 7 | A 1 in this bit position indicates that the instrument has been turned off and then on. |

The standard event status register is used to determine the specific event that set bit 5 in the status byte register. To query the standard event status register, send the command *ESR?. The response will be the decimal sum of the bits which are enabled (set to 1). For example, if bit number 7 and bit number 3 are enabled, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned.

In addition to the standard event status register, the standard event status group also contains a standard event status enable register. This register lets you choose which bits in the standard event status register will set the summary bit (bit 5 of the status byte register) to 1. Send the *ESE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable. For example, to enable bit 7 and bit 6 so that whenever either of those bits is set to 1, the standard event status summary bit of the status

byte register will be set to 1, send the command *ESE 192 (128 + 64). The command *ESE? returns the decimal value of the sum of the bits previously enabled with the *ESE <integer> command.

The standard event status enable register presets to zeros (0).



*ESE <num>
 *ESE?

Standard Event Status Enable Register

ck728a

Operation and Questionable Status Registers

The operation and questionable status registers are registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. See the figure at the beginning of this chapter.

Operation Status Register

The operation status register monitors the current instrument measurement state. It checks to see if the instrument is calibrating, sweeping, or waiting for a trigger. For more information see the *OPC? command located in the IEEE Common Commands section.

| Bit | Condition | Operation |
|-----|---------------------|---|
| 0 | Calibrating | The instrument is busy executing its Align Now process |
| 3 | Sweeping | The instrument is busy taking a sweep. |
| 4 | Measuring | The instrument is busy making a measurement. Measurements often require multiple sweeps. They are initiated by keys under the MEASURE key or with the MEASure group of commands. The bit is valid for most X-Series Modes. |
| 5 | Waiting for trigger | The instrument is waiting for the trigger conditions to be met, then it will trigger a sweep or measurement. |

Questionable Status Register

The questionable status register monitors the instrument's condition to see if anything questionable has happened to it. It is looking for anything that might cause an error or a bad measurement like a hardware problem, an out of calibration situation, or a unusual signal. All the bits are summary bits from lower-level event registers.

| Bit | Condition | Operation |
|-----|-----------|-----------|
|-----|-----------|-----------|

| | | |
|---|---------------------|---|
| 3 | Power summary | The instrument hardware has detected a power unlevelled condition. |
| 4 | Temperature summary | The instrument is still warming up. |
| 5 | Frequency summary | The instrument hardware has detected an unlocked condition or a problem with the external frequency reference. |
| 8 | Calibration summary | The instrument has detected a hardware problem while doing the automatic internal alignment process. |
| 9 | Integrity summary | The instrument has detected a questionable measurement condition such as: bad timing, bad signal/data, timeout problem, signal overload, or "meas uncal". |

STATus Subsystem Command Descriptions

The STATus subsystem controls the SCPI-defined instrument status reporting structures. Each status register has a set of five commands used for querying or masking that particular register.

Numeric values for bit patterns can be entered using decimal or hexadecimal representations. (i.e. 0 to 32767 is equivalent to #H0 to #H7FFF. It is also equal to all ones, 111111111111111) See the SCPI Basics information about using bit patterns for variable parameters.

Operation Register

"Operation Condition Query" on page 133

"Operation Enable" on page 134

"Operation Event Query" on page 134

"Operation Negative Transition" on page 134

"Operation Positive Transition" on page 135

Operation Condition Query

This query returns the decimal value of the sum of the bits in the Status Operation Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|------------------------------|
| Mode | All |
| Remote Command | :STATus:OPERation:CONDition? |
| Example | STAT:OPER:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Operation Enable

This command determines which bits in the Operation Event register, will set the Operation Status Summary bit (bit 7) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

NOTE

The preset condition is to have all bits in this enable register set to 0. To have any Operation Events reported to the Status Byte Register, one or more bits need to be set to 1.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:OPERation:ENABle <integer> :STATus:OPERation:ENABle? |
| Example | STAT:OPER:ENAB 1 Sets the register so that Align Now operation will be reported to the Status Byte Register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Operation Event Query

This query returns the decimal value of the sum of the bits in the Operation Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|----------------------------|
| Mode | All |
| Remote Command | :STATus:OPERation[:EVENT]? |
| Example | STAT:OPER? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Operation Negative Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:OPERation:NTRansition <integer> :STATus:OPERation:NTRansition? |
| Example | STAT:OPER:NTR 1 Align Now operation complete will be reported to the Status Byte Register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Operation Positive Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:OPERation:PTRansition <integer> :STATus:OPERation:PTRansition? |
| Example | STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Preset the Status Byte

Sets bits in most of the enable and transition registers to their default state. It presets all the Transition Filters, Enable Registers, and the Error/Event Queue Enable. It has no effect on Event Registers, Error/Event QUEUE, IEEE 488.2 ESE, and SRE Registers as described in IEEE Standard 488.2–1992, IEEE Standard Codes, Formats, Protocols, and Common Commands for Use with ANSI/IEEE Std 488.1–1987. New York, NY, 1992.

| | |
|-----------------------|------------------|
| Remote Command | :STATus:PRESet |
| Example | STAT:PREs |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Register

"Questionable Condition " on page 136

"Questionable Enable " on page 136

"Questionable Event Query " on page 137

"Questionable Negative Transition " on page 137

"Questionable Positive Transition" on page 137

Questionable Condition

This query returns the decimal value of the sum of the bits in the Questionable Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---------------------------------|
| Mode | All |
| Remote Command | :STATus:QUEStionable:CONDition? |
| Example | STAT:QUES:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Enable

This command determines which bits in the Questionable Event register will set the Questionable Status Summary bit (bit3) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

NOTE The preset condition is all bits in this enable register set to 0. To have any Questionable Events reported to the Status Byte Register, one or more bits need to be set to 1. The Status Byte Event Register should be queried after each measurement to check the Questionable Status Summary (bit 3). If it is equal to 1, a condition during the test may have made the test results invalid. If it is equal to 0, this indicates that no hardware problem or measurement problem was detected by the analyzer.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:ENABle <integer> :STATus:QUEStionable:ENABle? |
| Example | STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Questionable Event Query

This query returns the decimal value of the sum of the bits in the Questionable Event register.

NOTE The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|-------------------------------|
| Mode | All |
| Remote Command | :STATus:QUESTionable[:EVENT]? |
| Example | STAT:QUES? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Negative Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:QUESTionable:NTRansition <integer> :STATus:QUESTionable:NTRansition? |
| Example | STAT:QUES:NTR 16 Temperature summary 'questionable cleared' will be reported to the Status Byte Register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Positive Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:PTRansition <integer> :STATus:QUESTionable:PTRansition? |
| Example | STAT:QUES:PTR 16 Temperature summary 'questionable asserted' will be reported to the Status Byte Register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Register

- "Questionable Calibration Condition " on page 138
- "Questionable Calibration Enable " on page 138
- "Questionable Calibration Event Query " on page 139
- "Questionable Calibration Negative Transition " on page 139
- "Questionable Calibration Positive Transition " on page 140

Questionable Calibration Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:CALibration:CONDition? |
| Example | STAT:QUES:CAL:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Enable

This command determines which bits in the Questionable Calibration Condition Register will set bits in the Questionable Calibration Event register, which also sets the Calibration Summary bit (bit 8) in the

Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:QUEStionable:CALibration:ENABle <integer> :STATus:QUEStionable:CALibration:ENABle? |
| Example | STAT:QUES:CAL:ENAB 16384 Can be used to query if an alignment is needed, if you have turned off the automatic alignment process. |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:CALibration[:EVENT]? |
| Example | STAT:QUES:CAL? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Negative Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:CALibration:NTRansition <integer> :STATus:QUEStionable:CALibration:NTRansition? |
| Example | STAT:QUES:CAL:NTR 16384 Alignment is not required. |
| Preset | 0 |

| | |
|------------------------------|--------------------|
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Positive Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:CALibration:PTRansition <integer> :STATus:QUEStionable:CALibration:PTRansition? |
| Example | STAT:QUES:CAL:PTR 16384 Alignment is required. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Calibration Skipped Register

[Questionable Calibration Skipped Condition](#)

[Questionable Calibration Skipped Enable](#)

[Questionable Calibration Skipped Event Query](#)

[Questionable Calibration Skipped Negative Transition](#)

[Questionable Calibration Skipped Positive Transition](#)

Questionable Calibration Extended Failure Register

[Questionable Calibration Extended Failure Condition](#)

[Questionable Calibration Extended Failure Enable](#)

[Questionable Calibration Extended Failure Event Query](#)

[Questionable Calibration Extended Failure Negative Transition](#)

[Questionable Calibration Extended Failure Positive Transition](#)

Questionable Frequency Register

"Questionable Frequency Condition " on page 141

"Questionable Frequency Enable " on page 141

"Questionable Frequency Event Query " on page 142

"Questionable Frequency Negative Transition " on page 142

"Questionable Frequency Positive Transition " on page 142

Questionable Frequency Condition

This query returns the decimal value of the sum of the bits in the Questionable Frequency Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:FREQuency:CONDition? |
| Example | STAT:QUES:FREQ:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Frequency Enable

This command determines which bits in the Questionable Frequency Condition Register will set bits in the Questionable Frequency Event register, which also sets the Frequency Summary bit (bit 5) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:FREQuency:ENABle <integer> :STATus:QUESTionable:FREQuency:ENABle? |
| Example | STAT:QUES:FREQ:ENAB 2 Frequency Reference Unlocked will be reported to the Frequency Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Frequency Event Query

This query returns the decimal value of the sum of the bits in the Questionable Frequency Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:FREQuency[:EVENT]? |
| Example | STAT:QUES:FREQ? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Frequency Negative Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:FREQuency:NTRansition <integer> :STATus:QUEStionable:FREQuency:NTRansition? |
| Example | STAT:QUES:FREQ:NTR 2 Frequency Reference 'regained lock' will be reported to the Frequency Summary of the Status Questionable register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Frequency Positive Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|------------------------------|---|
| Remote Command | :STATus:QUESTionable:FREQuency:PTRansition <integer> :STATus:QUESTionable:FREQuency:PTRansition? |
| Example | STAT:QUES:FREQ:PTR 2 Frequency Reference 'became unlocked' will be reported to the Frequency Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Register

"Questionable Integrity Condition " on page 143

"Questionable Integrity Enable " on page 143

"Questionable Integrity Event Query " on page 144

"Questionable Integrity Negative Transition " on page 144

"Questionable Integrity Positive Transition " on page 145

Questionable Integrity Condition

This query returns the decimal value of the sum of the bits in the Questionable Integrity Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:INTEgrity:CONDition? |
| Example | STAT:QUES:INT:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Enable

This command determines which bits in the Questionable Integrity Condition Register will set bits in the Questionable Integrity Event register, which also sets the Integrity Summary bit (bit 9) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|------------------------------|--|
| Remote Command | :STATus:QUEStionable:INTEgrity:ENABle <integer> :STATus:QUEStionable:INTEgrity:ENABle? |
| Example | STAT:QUES:INT:ENAB 8 Measurement Uncalibrated Summary will be reported to the Integrity Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:INTEgrity[:EVENT]? |
| Example | STAT:QUES:INT? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Negative Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a negative transition (1 to 0)

The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :STATus:QUEStionable:INTEgrity:NTRansition <integer> :STATus:QUEStionable:INTEgrity:NTRansition? |
| Example | STAT:QUES:INT:NTR 8 Measurement 'regained calibration' Summary will be reported to the Integrity Summary of the Status Questionable register. |
| Preset | 0 |

| | |
|------------------------------|--------------------|
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Positive Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:QUEStionable:INTEgrity:PTRansition <integer> :STATus:QUEStionable:INTEgrity:PTRansition? |
| Example | STAT:QUES:INT:PTR 8 Measurement 'became uncalibrated' Summary will be reported to the Integrity Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Integrity Signal Register

- Questionable Integrity Signal Condition
- Questionable Integrity Signal Enable
- Questionable Integrity Signal Event Query
- Questionable Integrity Signal Negative Transition
- Questionable Integrity Signal Positive Transition

Questionable Integrity Uncalibrated Register

- Questionable Integrity Uncalibrated Condition
- Questionable Integrity Uncalibrated Enable
- Questionable Integrity Uncalibrated Event Query
- Questionable Integrity Uncalibrated Negative Transition

Questionable Integrity Uncalibrated Positive Transition

Questionable Power Register

"Questionable Power Condition " on page 146

"Questionable Power Enable " on page 146

"Questionable Power Event Query " on page 147

"Questionable Power Negative Transition " on page 147

"Questionable Power Positive Transition " on page 147

Questionable Power Condition

This query returns the decimal value of the sum of the bits in the Questionable Power Condition register.

NOTE

The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---------------------------------------|
| Mode | All |
| Remote Command | :STATus:QUEStionable:POWer:CONDition? |
| Example | STAT:QUES:POW:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Power Enable

This command determines which bits in the Questionable Power Condition Register will set bits in the Questionable Power Event register, which also sets the Power Summary bit (bit 3) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:QUEStionable:POWer:ENABle <integer> :STATus:QUEStionable:POWer:ENABle? |
| Example | STAT:QUES:POW:ENAB 32 50 MHz Input Pwr too High for Cal will be reported to the Power Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Power Event Query

This query returns the decimal value of the sum of the bits in the Questionable Power Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

| | |
|------------------------------|-------------------------------------|
| Mode | All |
| Remote Command | :STATus:QUEStionable:POWer[:EVENT]? |
| Example | STAT:QUES:POW? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Power Negative Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|--|
| Mode | All |
| Remote Command | :STATus:QUEStionable:POWer:NTRansition <integer> :STATus:QUEStionable:POWer:NTRansition? |
| Example | STAT:QUES:POW:NTR 32 50 MHz Input Power became OK for Cal will be reported to the Power Summary of the Status Questionable register. |
| Preset | 0 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Power Positive Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|------------------------------|--|
| Remote Command | :STATus:QUESTionable:POWer:PTRansition <integer> :STATus:QUESTionable:POWer:PTRansition?> |
| Example | STAT:QUES:POW:PTR 32 50 MHz Input Power became too high for Cal will be reported to the Power Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Temperature Register

- "Questionable Temperature Condition" on page 148
- "Questionable Temperature Enable" on page 148
- "Questionable Temperature Event Query" on page 149
- "Questionable Temperature Negative Transition" on page 149
- "Questionable Temperature Positive Transition" on page 150

Questionable Temperature Condition

This query returns the decimal value of the sum of the bits in the Questionable Temperature Condition register.

NOTE The data in this register is continuously updated and reflects the current conditions.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:TEMPerature:CONDition? |
| Example | STAT:QUES:TEMP:COND? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Temperature Enable

This command determines which bits in the Questionable Temperature Condition Register will set bits in the Questionable Temperature Event register, which also sets the Temperature Summary bit (bit 4) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:TEMPerature:ENABle <integer> :STATus:QUESTionable:TEMPerature:ENABle? |
| Example | STAT:QUES:TEMP:ENAB 1 Reference Oscillator Oven Cold will be reported to the Temperature Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Temperature Event Query

This query returns the decimal value of the sum of the bits in the Questionable Temperature Event register.

NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:TEMPerature[:EVENT]? |
| Example | STAT:QUES:TEMP? |
| Preset | 0 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Temperature Negative Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :STATus:QUESTionable:TEMPerature:NTRansition <integer> :STATus:QUESTionable:TEMPerature:NTRansition? |
| Example | STAT:QUES:TEMP:NTR 1 Reference Oscillator Oven not cold will be reported to the Temperature Summary of the Status Questionable register. |
| Preset | 0 |

| | |
|------------------------------|--------------------|
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Questionable Temperature Positive Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

| | |
|------------------------------|---|
| Mode | All |
| Remote Command | :STATus:QUESTionable:TEMPerature:PTRansition <integer> :STATus:QUESTionable:TEMPerature:PTRansition? |
| Example | STAT:QUES:TEMP:PTR 1 Reference Oscillator Oven became cold will be reported to the Temperature Summary of the Status Questionable register. |
| Preset | 32767 |
| Min | 0 |
| Max | 32767 |
| Status Bits/OPC dependencies | Sequential command |
| Initial S/W Revision | Prior to A.02.00 |

Common Commands

- "All (Daily use)" on page 300
- "Clear Status " on page 153
- "Standard Event Status Enable " on page 154
- "Standard Event Status Register Query " on page 154
- "Identification Query " on page 155
- "Operation Complete " on page 155
- "Query Instrument Options " on page 156
- "Recall Instrument State " on page 156
- "*RST (Remote Command Only)" on page 157
- "Save Instrument State " on page 157
- "Service Request Enable " on page 158
- "Status Byte Query " on page 158
- "Trigger " on page 158
- "Self Test Query " on page 159
- "Wait-to-Continue " on page 159

All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The "All" alignment is sufficient to maintain specified performance, provided that (1) the TRX's internal temperature has not drifted more than +/-5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous "All" alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up period between power-up of the TRX and invoking the "All" alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is generated. In addition the Error Condition message "Align Now, RF required" is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or *CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now, All** will clear the "Align Now, All required" Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

NOTE In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All**.

| | |
|-------------------------------------|---|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration[:ALL] :CALibration[:ALL]? |
| Example | :CAL |
| Notes | :CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed. |
| Couplings | Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature. |
| Status Bits/OPC dependencies | Bits 11, 12, or 14 may be set in the Status Questionable Calibration register. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | *CAL? |
| Example | *CAL? |
| Notes | *CAL? returns 0 if successful *CAL? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? See additional remarks described with :CALibration[:ALL]? Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALibration[:ALL]:NPENDING |
| Example | CAL:NPEN |
| Notes | :CALibration[:ALL]:NPENDING is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:ALL:NPENDING (Start a calibration) 2) :STATUS:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3) :STATUS:QUESTionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure) |
| Initial S/W Revision | X.14.20 |

Clear Status

Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.

| | |
|-------------------------------|--|
| Key Path | No equivalent key. Related key System, Show Errors, Clear Error Queue |
| Remote Command | *CLS |
| Example | *CLS Clears the error queue and the Status Byte Register. |
| Notes | For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem. |
| Status Bits/OPC dependencies | Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also. |
| Backwards Compatibility Notes | In general the status bits used in the X-Series status system will be backwards compatible with ESA and PSA. However, note that all conditions will generate events that go into the event log, and some |

| | |
|----------------------|---------------------------------|
| | will also generate status bits. |
| Initial S/W Revision | Prior to A.02.00 |

Standard Event Status Enable

Selects the desired bits from the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, status execution error, command error, and power on. The selected bits are OR'd to become a summary bit (bit 5) in the byte register which can be queried.

The query returns the state of the standard event status enable register.

| | |
|------------------------------|---|
| Key Path | No equivalent key. Related key System, Show Errors, Clear Error Queue |
| Remote Command | *ESE <integer> *ESE? |
| Example | *ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled. |
| Notes | For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands. |
| Preset | 255 |
| State Saved | Not saved in state. |
| Min | 0 |
| Max | 255 |
| Status Bits/OPC dependencies | Event Enable Register of the Standard Event Status Register. |
| Initial S/W Revision | Prior to A.02.00 |

Standard Event Status Register Query

Queries and clears the standard event status event register. (This is a destructive read.) The value returned is a hexadecimal number that reflects the current state (0/1) of all the bits in the register.

| | |
|------------------------------|---|
| Remote Command | *ESR? |
| Example | *ESR? Returns a 1 if there is either a query or command error, otherwise it returns a zero. |
| Notes | For related commands, see the STATus subsystem commands. |
| Preset | 0 |
| Min | 0 |
| Max | 255 |
| Status Bits/OPC dependencies | Standard Event Status Register (bits 0 - 7). |
| Initial S/W Revision | Prior to A.02.00 |

Identification Query

Returns a string of instrument identification information. The string will contain the model number, serial number, and firmware revision.

The response is organized into four fields separated by commas. The field definitions are as follows:

- Manufacturer
- Model
- Serial number
- Firmware version

| | |
|--------------------------|---|
| Key Path | No equivalent key. See related key System, Show System. |
| Remote Command | *IDN? |
| Example | *IDN? Returns instrument identification information, such as: Keysight Technologies, E6650A, US01020004, E.14.50 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | x.14.50 |

Operation Complete

The *OPC command sets bit 0 in the standard event status register (SER) to “1” when pending operations have finished, that is when all overlapped commands are complete. It does not hold off subsequent operations. You can determine when the overlapped commands have completed either by polling the OPC bit in SER, or by setting up the status system such that a service request (SRQ) is asserted when the OPC bit is set.

The *OPC? query returns a “1” after all the current overlapped commands are complete. So it holds off subsequent commands until the “1” is returned, then the program continues. This query can be used to synchronize events of other instruments on the external bus.

| | |
|-------------------------------|--|
| Remote Command | *OPC *OPC? |
| Example | INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete. |
| Status Bits/OPC dependencies | Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. *OPC is an overlapped command, but *OPC? is sequential. |
| Backwards Compatibility Notes | 1. The ESA/PSA/VSA products do not meet all the requirements for the *OPC command specified by IEEE 488.2. This is corrected for X-Series. This will sometimes cause behavior that is not backward compatible, but it will work as customers expect. |

-
2. Commands such as, *OPC/*OPC?/*WAI/*RST used to be global. They considered front panel operation in conjunction with the GPIB functionality. Now they are evaluated on a per channel basis. That is, the various rear panel remote ports and the front panel i/o are all considered separately. Only the functionality initiated on the port where the *OPC was sent, is considered for its operation.
 3. *OPC used to hold off until the operation bits were cleared. Now it holds off until all overlapping commands are completed. Also, earlier instruments did not wait for completion of all processes, only the ones identified here (in the STATus:OPERation register):
 - Calibrating: monitored by PSA, ESA, VSA (E4406A)
 - Sweeping: monitored by PSA, ESA, VSA (E4406A)
 - Waiting for Trigger: monitored by PSA, ESA, VSA (E4406A)
 - Measuring: monitored by PSA and ESA (but not in all Modes).
 - Paused: monitored by VSA (E4406A).
 - Printing: monitored by VSA (E4406A).
 - Mass memory busy: monitored by VSA (E4406A).
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Query Instrument Options

Returns a string of all the installed instrument options. It is a comma separated list with quotes, such as: "503,P03,PFR".

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous SA products and software. So, the actual implementation will use arbitrary ascii. But quotes will be sent as the first and last ascii characters that are sent with the comma-separated option list.

| | |
|-----------------------|-------|
| Remote Command | *OPT? |
|-----------------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Recall Instrument State

This command recalls the instrument state from the specified instrument memory register.

- If the state being loaded has a newer firmware revision than the revision of the instrument, no state is recalled and an error is reported
- If the state being loaded has an equal firmware revision than the revision of the instrument, the state will be loaded.
- If the state being loaded has an older firmware revision than the revision of the instrument, the instrument will only load the parts of the state that apply to the older revision.

| | |
|-----------------------|-------------------|
| Remote Command | *RCL <register #> |
|-----------------------|-------------------|

| | |
|----------------|---|
| Example | *RCL 7 Recalls the instrument state that is currently stored in register 7. |
|----------------|---|

| | |
|------------------------------|--|
| Notes | Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers. |
| Min | 0 |
| Max | 127 |
| Status Bits/OPC dependencies | The command is sequential. |
| Initial S/W Revision | Prior to A.02.00 |

*RST (Remote Command Only)

*RST is equivalent to :SYST:PRES::INIT:CONT OFF, which is a Mode Preset in the Single measurement state. This remote command is preferred over Mode Preset remote command - :SYST:PRES, as optimal remote programming occurs with the instrument in the single measurement state.

| | |
|-------------------------------|--|
| Remote Command | *RST |
| Example | *RST |
| Notes | Sequential Clears all pending OPC bits and the Status Byte is set to 0. |
| Couplings | A *RST will cause the currently running measurement to be aborted and cause the default measurement to be active. *RST gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In legacy analyzers *RST did not set the analyzer to Single, but in the X-Series it does, for compliance with the IEEE 488.2 specification. In the X-Series, *RST does not do a *CLS (clear the status bits and the error queue). In legacy analyzers, *RST used to do the equivalent of SYSTem:PRESet, *CLS and INITiate:CONTinuous OFF. But to be 488.2 compliant, *RST in the X-Series does not do a *CLS. |
| Initial S/W Revision | Prior to A.02.00 |

Save Instrument State

This command saves the current instrument state and mode to the specified instrument memory register.

| | |
|------------------------------|--|
| Remote Command | *SAV <register #> |
| Example | *SAV 9 Saves the instrument state in register 9. |
| Notes | Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers. |
| Min | 0 |
| Max | 127 |
| Status Bits/OPC dependencies | The command is sequential. |
| Initial S/W Revision | Prior to A.02.00 |

Service Request Enable

This command enables the desired bits of the service request enable register.

The query returns the value of the register, indicating which bits are currently enabled.

| | |
|-------------------------------------|---|
| Remote Command | *SRE <integer> *SRE? |
| Example | *SRE 22 Enables bits 1, 2, and 4 in the service request enable register. |
| Notes | For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands. |
| Preset | 0 |
| Min | 0 |
| Max | 255 |
| Status Bits/OPC dependencies | Service Request Enable Register (all bits, 0 – 7). |
| Initial S/W Revision | Prior to A.02.00 |

Status Byte Query

Returns the value of the status byte register without erasing its contents.

| | |
|-------------------------------------|---|
| Remote Command | *STB? |
| Example | *STB? Returns a decimal value for the bits in the status byte register. For example, if a 16 is returned, it indicates that bit 5 is set and one of the conditions monitored in the standard event status register is set. |
| Notes | See related command *CLS. |
| Status Bits/OPC dependencies | Status Byte Register (all bits, 0 – 7). |
| Initial S/W Revision | Prior to A.02.00 |

Trigger

This command triggers the instrument. Use the :TRIGger[:SEQUence]:SOURce command to select the trigger source.

| | |
|-----------------------------|--|
| Key Path | No equivalent key. See related keys Single and Restart. |
| Remote Command | *TRG |
| Example | *TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings. |
| Notes | See related command :INITiate:IMMEDIATE. |
| Initial S/W Revision | Prior to A.02.00 |

Self Test Query

This query performs the internal self-test routines and returns a number indicating the success of the testing. A zero is returned if the test is successful, 1 if it fails.

| | |
|-----------------------------|---|
| Remote Command | *TST? |
| Example | *TST? Runs the self-test routines and returns 0=passed, 1=some part failed. |
| Initial S/W Revision | Prior to A.02.00 |

Wait-to-Continue

This command causes the instrument to wait until all overlapped commands are completed before executing any additional commands. There is no query form for the command.

| | |
|-------------------------------------|---|
| Remote Command | *WAI |
| Example | INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion. |
| Status Bits/OPC dependencies | Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. |
| Initial S/W Revision | Prior to A.02.00 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

4 Input/Output Functions

Input/Output

The Input/Output features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Input/Output key accesses the keys that control the Input/Output parameters of the instrument. In general, these are functions associated with external connections to the analyzer, either to the inputs or the outputs. Since these connections tend to be fairly stable within a given setup, in general, the input/output settings do not change when you Preset the analyzer.

Other functions related to the input/output connections, but which tend to change on a measurement by measurement basis, can be found under the **Trigger** and **AMPTDY Scale** keys. In addition, some of the digital I/O bus configurations can be found under the **System** key.

NOTE

The functions in the Input/Output menu are "global" (common) to all Modes (applications). But individual Input/Output functions only appear in a Mode if they apply to that Mode. Functions that apply to a Mode but not to all measurements in the Mode may be grayed-out in some measurements.

["Input/Output variables - Preset behavior" on page 163](#)

The Input Port selection is the first menu under the **Input/Output** key:

| Key Path | Front-panel key |
|-------------------------------------|---|
| Remote Command | <code>[:SENSe] :FEED RF AIQ EMIXer</code> <code>[:SENSe] :FEED?</code> |
| Example | <code>:FEED RF</code> <code>:FEED?</code> |
| Couplings | The <code>[:SENSe] :FEED RF</code> command turns the calibrator OFF |
| Preset | This setting is unaffected by a Preset or power cycle. It survives a Mode Preset and mode changes. It is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | <code>[:SENSe] :FEED AREFERENCE</code> In the PSA the calibrator was one of the inputs and selected using the AREF parameter to the same <code>:FEED</code> command that switched the inputs. In the X-Series it is controlled in a separate menu and overrides the input selection. For code compatibility the <code>[:SENSe] :FEED AREFERENCE</code> command is provided, and is aliased to <code>[:SENSe] :FEED :AREF REF50</code> , which causes the input to be switched to the 50 MHz calibrator. The <code>[:SENSe] :FEED RF</code> command switches the input back to the RF port and turns the calibrator OFF, thus providing full compatibility with the PSA calibrator function. Note that after sending this, the query <code>[:SENSe] :FEED?</code> will NOT return "AREF" but instead the currently selected input. |
| Backwards Compatibility SCPI | <code>[:SENSe] :FEED IQ IONLy QONLy</code> <code>[:SENSe] :FEED?</code> The parameters <code>IQ IONLy QONLy</code> are supported for backwards compatibility with the E44406A. <code>[:SENSe] :FEED IQ</code> aliases to <code>[:SENSe] :FEED :IQ :TYPE IQ</code> <code>[:SENSe] :FEED IONLy</code> aliases to <code>[:SENSe] :FEED :IQ :TYPE IONLy</code> |

| | |
|-------------------------------|---|
| | <p>[;SENSe]:FEED QONLy aliases to [;SENSe]:FEED:IQ:TYPE QONLy</p> <p>The query [;SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ IONLy QONLy has been used.</p> |
| Backwards Compatibility Notes | <p>Most of the settings in the X-Series Input/Output system, including External Gain, Amplitude Corrections settings and data, etc., are shared by all modes and are not changed by a mode switch. Furthermore, most variables in the Input/Output system key are not affected by Mode Preset. Both of these behaviors represent a departure from legacy behavior.</p> <p>In the X-Series. Input/Output settings are reset by using the "Restore Input/Output Defaults" function. They can also be reset to their default values through the System-> Restore System Defaults-> In/Out Config key or through the System -> Restore System Defaults -> All key (and corresponding SCPI).</p> <p>While this matches most use cases better, it does create some code compatibility issues. For example, Amplitude Corrections are no longer turned off by a Mode Preset, but instead by using the "Restore Input/Output Defaults" key/SCPI.</p> <p>Although Input/Output settings are not part of each Mode's State, they are saved in the Save State files, so that all of the instrument settings can be recalled with Recall State, as in legacy instruments.</p> |
| Initial S/W Revision | Prior to A.02.00 |
| Remote Command | <p>:INPut:MIXer EXTernal INTernal</p> <p>:INPut:MIXer?</p> |
| Example | <p>INP:MIX INT</p> <p>INP:MIX?</p> |
| Notes | <p>In legacy analyzers you choose between the Internal mixer or an External Mixer. In the X-Series, the External Mixer is one of the choices for the Input and is selected using the FEED command (:SENSe:FEED EXTMIxer).</p> <p>For compatibility, the INPut:MIXer EXTernal INTernal legacy command is mapped as follows:</p> <ol style="list-style-type: none"> 1. When INPut:MIXer EXTernal is received, SENSe:FEED EMIXer is executed. 2. When INPut:MIXer INTernal is received, SENSe:FEED RF is executed. 3. When INPut:MIXer? is received, the response will be INT if any input other than the external mixer is selected and EXT if the external mixer is selected |
| Preset | INT |
| Backwards Compatibility Notes | <p>PSA supports the following SCPI Command :</p> <p>:INPut:MIXer:TYPE PRESelected UNPReselect</p> <p>:INPut:MIXer:TYPE?</p> <p>PXA does not support the :INPut:MIXer:TYPE command.</p> |
| Initial S/W Revision | A.08.01 |

Input/Output variables - Preset behavior

Virtually all the input/output settings are NOT a part of mode preset. They can be set to their default value

by one of the three ways:

- by using the Restore Input/Output Defaults key on the first page of the input/output menu,
- by using the System->Restore System Defaults->Input/Output Settings or,
- by using the System -> Restore System Defaults->All. Also, they survive a Preset and a Power cycle.

A very few of the Input/Output settings do respond to a Mode Preset; for example, if the Calibrator is on it turns off on a Preset, and if DC coupling is in effect it switches to AC on a Preset. These exceptions are made in the interest of reliability and usability, which overrides the need for absolute consistency. Exceptions are noted in the SCPI table for the excepted functions.

RF Input

Selects the front-panel RF input port to be the analyzer signal input. If RF is already selected, pressing this key accesses the RF input setup functions.

| Key Path | Input/Output |
|--------------------------|---|
| Example | [:SENSe]:FEED RF |
| Couplings | The act of connecting the U7227A USB Preamplifier to one of the analyzer's USB ports will cause the Input to automatically switch to the RF Input. If the RF Calibrator is on, it is turned off. Subsequently disconnecting the USB Preamp from USB does not change the Input selection nor restore the previous selection. |
| Readback | The RF input port, RF coupling, and current input impedance settings appear on this key as: "XX, YY, ZZ" where XX is RF, RF2, RFIO1, RFIO2, depending on what input is selected (only appears on analyzers with multiple RF inputs) YY is AC or DC ZZ is 50Ω or 75Ω |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

Input Z Correction

Sets the input impedance for unit conversions. This affects the results when the y-axis unit is voltage or current units (dBmV, dBμV, dBμA, V, A), but not when it is power units (dBm, W). The impedance you select is for computational purposes only, since the actual impedance is set by internal hardware to 50 ohms. Setting the computational input impedance to 75 ohms is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an analyzer with a 50 ohm input impedance.

There are a variety of ways to make 50 to 75 ohm transitions, such as impedance transformers or minimum loss pads. The choice of the solution that is best for your measurement situation requires balancing the amount of loss that you can tolerate with the amount of measurement frequency range that you need. If you are using one of these pads/adaptors with the **Input Z Corr** function, you might also want to use the **Ext Gain** key. This function is used to set a correction value to compensate for the gain (loss) through your pad. This correction factor is applied to the displayed measurement values.

| | |
|----------------------|---|
| Key Path | Input/Output, RF Input |
| Remote Command | <code>[:SENSe] :CORRection:IMPedance [:INPut] [:MAGNitude] 50 75</code> <code>[:SENSe] :CORRection:IMPedance [:INPut] [:MAGNitude] ?</code> |
| Example | CORR:IMP 75 sets the input impedance correction to 75 ohms. CORR:IMP? |
| Preset | This is unaffected by a Preset but is set to 50 ohms on a "Restore Input/Output Defaults" or "Restore System Defaults->All" Some instruments/options may have 75 ohms available. |
| State Saved | Saved in instrument state |
| Readback | 50 Ω or 75 Ω. Current setting reads back to the RF key. |
| Initial S/W Revision | Prior to A.02.00 |

RF Input Port

Specifies the RF input port used. The RF Input Port key only appears on units with multiple inputs, and lets you switch between the two inputs.

Switching from the RF input port to one of the RFIO ports, on units that have them, changes the receiver performance of the instrument.

| | |
|------------------------------|--|
| Key Path | Input/Output, RF Input |
| Remote Command | <code>[:SENSe] :FEED:RF:PORT [:INPut] RFIN RFIN2 RFIO1 RFIO2 RFIO3 RFIO4</code> <code>[:SENSe] :FEED:RF:PORT [:INPut] ?</code> |
| Example | :FEED:RF:PORT RFIN |
| Dependencies | This key only appears in models that support multiple inputs. If the SCPI command is sent with unsupported parameters in any other model, an error is generated, -221.1900, "Settings conflict;option not installed" When any input is selected in a measurement that does not support it, the "No result; Meas invalid with this input" error condition occurs, and the measurement returns invalid data when queried. |
| Preset | This is unaffected by Mode Preset but is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All" |
| State Saved | Saved in instrument state |
| Readback | The current RF Input Port selected is read back to this key |
| Backwards Compatibility SCPI | <code>INPut<1 2>:TYPE INPUT1 INPUT2</code> <code>INPut<1 2>:TYPE?</code> Included for R&S ESU compatibility. In the MXE, the INPUT1 parameter is aliased to RFIN and the INPUT2 parameter is aliased to RFIN2 |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RF Input

Specifies using the main RF port for the current measurement

| | |
|--------------------------|---|
| Key Path | Input/Output, RF Input, RF Input Port |
| Example | :FEED:RF:PORT RFIN |
| Notes | If RF Input is selected as RF Input Port, you need to choose the settings in the Half Duplex Config menu to determine which port (RFIO3 or RFIO4) will be used. |
| ReadBack | RF Input |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RFIO1

Specifies using the RFIO 1 port for the current measurement

| | |
|----------------------|---|
| Key Path | Input/Output, RF Input, RF Input Port |
| Example | :FEED:RF:PORT RFIO1 |
| Dependencies | RFIO1 is not available in E6607C. If Multiport Adapter is ON, Select RF Input to RFIO1, an error message is generated: “-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON”. |
| ReadBack | RFIO 1 |
| Initial S/W Revision | A.05.01 |

RFIO2

Specifies using the RFIO 2 port for the current measurement

| | |
|----------------------|---|
| Key Path | Input/Output, RF Input, RF Input Port |
| Example | :FEED:RF:PORT RFIO2 |
| Dependencies | RFIO2 is not available in E6607C. If Multiport Adapter is ON, Select RF Input to RFIO2, an error message is generated: “-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON”. |
| ReadBack | RFIO 2 |
| Initial S/W Revision | A.05.01 |

External Gain

Compensates for gain or loss in the measurement system outside the spectrum analyzer. The External Gain is subtracted from the amplitude readout (or the loss is added to the amplitude readout). So, the displayed signal level represents the signal level at the output of the device-under-test, which can be the input of an external device that provides gain or loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of the values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, etc., are all affected by External Gain. Changing the External Gain, even on a trace that is not updating, will immediately change all of the above, without new data needing to be taken.

NOTE

Changing the External Gain causes the analyzer to immediately stop the current sweep and prepare to begin a new sweep. The data will not change until the trace data updates because the offset is applied to the data as it is taken. If a trace is exported with a nonzero External Gain, the exported data will contain the trace data with the offset applied.

In the Spectrum Analyzer mode, a Preamp is the common external device providing gain or loss. In a measurement application mode like GSM or W-CDMA, the gain or loss could be from a BTS (Base Transceiver Station) or an MS (Mobile Station). So in the Spectrum Analyzer mode MS and BTS would be grayed out and the only choice would be Ext Preamp. Similarly in some of the digital communications applications, Ext Preamp will be grayed out and you would have a choice of MS or BTS.

| Key Path | Input/Output |
|----------------------|--|
| Couplings | The Ext Preamp, MS, and BS keys may be grayed out depending on which measurement is currently selected. If any of the grayed out keys are pressed, or the equivalent SCPI command is sent, an advisory message is generated. |
| Readback | 1-of-N selection [variable] |
| Initial S/W Revision | Prior to A.02.00 |

Ext Preamp

This function is similar to the reference level offset function. Both affect the displayed signal level. Ref Lvl Offset is a mathematical offset only, no analyzer configuration is affected. Ext Preamp gain is used when determining the auto-coupled value of the Attenuator. The External Gain value and the Maximum Mixer Level settings are both part of the automatic setting equation for the RF attenuation setting. (10 dB of Attenuation is added for every 10 dB of External Gain.)

Note that the Ref Lvl Offset and Maximum Mixer Level are described in the Amplitude section. They are reset by the instrument Preset. The External Preamp Gain is reset by the "Restore Input/Output Defaults" or "Restore System Defaults->All functions. . The External Gain is subtracted from the amplitude readout so that the displayed signal level represents the signal level at the output of the device-under-test, which is the input of the external device that is providing gain or loss.

["More Information" on page 168](#)

| Key Path | Input/Output, External Gain |
|----------|-----------------------------|
|----------|-----------------------------|

| | |
|-------------------------------------|--|
| Remote Command | <code>[:SENSe] :CORRection:SA[:RF]:GAIN <rel_ampl></code> <code>[:SENSe] :CORRection:SA[:RF]:GAIN?</code> |
| Example | CORR:SA:GAIN 10 sets the Ext Gain value to 10 dB CORR:SA:GAIN -10 sets the Ext Gain value to -10 dB (that is, an attenuation of 10 dB) |
| Notes | Does not auto return. |
| Dependencies | The reference level limits are determined in part by the External Gain/Atten, Max Mixer Level, and RF Atten. This key is grayed out in Modes that do not support External Gain |
| Preset | This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Min | -120 dB |
| Max | 120 dB |
| Readback | Preamp Gain, <Ext Gain value> dB |
| Backwards Compatibility SCPI | <code>[:SENSe] :CORRection:OFFSet[:MAGNitude]</code> The legacy "Ext Preamp Gain" key is now called "Ext Gain" and the sub-menu has choices of Ext Preamp MS BTS for backwards compatibility. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

More Information

The U7227A USB Preamplifier is an accessory for the X-Series Signal Analyzer that provides gain externally, and whose gain settings are automatically loaded into the analyzer over USB whenever it is connected to one of the analyzer's USB ports.

While the USB Preamplifier is plugged into one of the analyzer's USB ports, the analyzer will consider it to be in the signal path of the RF Input and will apply the calibration data from the USB Preamp to measurements taken at the RF Input (on 2 input boxes, it will be considered to be in the signal path of RF Input 1; it is not supported for RF Input 2).

The USB Preamplifier contains its own cal data. This includes a noise trace suitable for use with NFE, for those models which support NFE. The act of connecting the Preamp to USB will cause the cal data to be downloaded from the preamp. When this happens an informational message is provided saying "Cal data loaded from USB Preamp". The analyzer will then automatically apply the calibration factors loaded from the Preamp in any measurement that supports the USB Preamp.

The External Preamp Gain setting may still be used, even though it is not required for the USB Preamp (since the USB Preamp supplies its own gain data to the analyzer which is applied automatically). Connecting the USB Preamp does not change the External Preamp Gain setting, however unless you have another gain or attenuation element in the signal path, the appropriate setting for External Preamp Gain is 0 dB.

Overload detection and reporting will apply when the USB preamplifier is connected to USB. The USB Preamplifier has its own overload detector which reports overloads to the instrument over USB. This generates an error condition, "Input Overload;USB Preamp."

If, while the USB Preamp is connected to USB, a measurement is selected that does not support the USB preamplifier, the "No result; Meas invalid with Preamp" error condition is generated.

MS

Sets an external gain/attenuation value for MS (Mobile Station) tests.

| Key Path | Input/Output, External Gain |
|-----------------------|--|
| Remote Command | <code>[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl></code> <code>[:SENSe]:CORRection:MS[:RF]:GAIN?</code> |
| Example | CORR:MS:GAIN 10 sets the Ext Gain value to 10 dB CORR:MS:GAIN -10 sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.) |
| Notes | Does not auto return. |
| Dependencies | The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support MS. |
| Preset | This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state. |
| Min | -100 dB |
| Max | 100 dB |
| Readback | MS, <Ext Gain value> dB |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl></code> <code>[:SENSe]:CORRection:MS[:RF]:LOSS?</code> |
| Example | CORR:MS:LOSS 10 sets the Ext Gain value to -10 dB, and subsequently querying :LOSS will give 10 dB CORR:MS:LOSS -10 sets the Ext Gain value to 10 dB, and subsequently querying :LOSS will give -10 dB |
| Notes | A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime :LOSS is set it sets :GAIN to the negative value of the parameter sent. Anytime :LOSS is queried it gives the negative of :GAIN |
| Preset | This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| Min | 100 dB |
| Max | -100 dB |
| Initial S/W Revision | Prior to A.02.00 |

BTS

Sets an external attenuation value for BTS (Base Transceiver Station) tests.

| Key Path | Input/Output, External Gain |
|-----------------------|---|
| Remote Command | <code>[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl></code> <code>[:SENSe]:CORRection:BTS[:RF]:GAIN?</code> |
| Example | CORR:BTS:GAIN 10 sets the Ext Gain value to 10 dB CORR:BTS:GAIN -10 sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.) |
| Notes | Does not auto return. |
| Dependencies | The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support BTS. |
| Preset | This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state. |
| Min | -100 dB |
| Max | 100 dB |
| Readback | BTS, <Ext Gain value> dB |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_ampl></code> <code>[:SENSe]:CORRection:BTS[:RF]:LOSS?</code> |
| Example | CORR:BTS:LOSS 10 sets the Ext Gain value to -10 dB, and subsequently querying :LOSS will give 10 dB CORR:BTS:LOSS -10 sets the Ext Gain value to 10 dB, and subsequently querying :LOSS will give -10 dB |
| Notes | A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime :LOSS is set it sets :GAIN to the negative value of the parameter sent. Anytime :LOSS is queried it gives the negative of :GAIN |
| Preset | This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| Min | 100 dB |
| Max | -100 dB |
| Initial S/W Revision | Prior to A.02.00 |

Restore Input/Output Defaults

This selection causes the group of settings and data associated with the **Input/Output** key to be a reset to their default values. In addition, when a Source is installed, licensed and selected, Restore Input/Output defaults will initiate a Source Preset.

This level of Restore System Defaults does not affect any other system settings or mode settings and does not cause a mode switch. All the features described in this section are reset using this key, including Input Corrections and Data (described in the Corrections section).

| Key Path | Input/Output |
|----------------------|--|
| Example | :SYST:DEF INP presets all the Input/Output variables to their factory default values. |
| Notes | Refer to the Utility Functions for information about Restore System Defaults and the complete description of the :SYSTem:DEFault INPut: command. |
| Initial S/W Revision | Prior to A.02.00 |

Data Source

Gives you the choice of either using a hardware input signal as the input or raw data stored in a data storage buffer from an earlier acquisition. You can also share raw data across certain measurements that support this feature. The measurements must be capable of storing raw data. There are three choices under this menu. You can select "Inputs" which is the same as selecting one of the inputs from the input port, for example RF, AREF, I/Q, or IFAlign. Selecting "Capture Buffer" allows you to use data that has been stored earlier in the same measurement or from a previous measurement using the "Current Meas -> Capture Buffer" feature. Selecting "Recorded Data" allows you to playback long data capture records stored in the record buffer.

| Key Path | Input/Output |
|-------------------------------------|---|
| Remote Command | [:SENSe] :FEED:DATA INPut STORed [:SENSe] :FEED:DATA? |
| Example | FEED:DATA STOR FEED:DATA? |
| Notes | INPut = Inputs STORed = Capture Buffer |
| Dependencies | Not all inputs are available in all modes. Unavailable keys are grayed out. |
| Preset | This is unaffected by Preset but is set to INPut on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Readback | Variable |
| Backwards Compatibility SCPI | [:SENSe] :FEED:SOURce INPut STORed [:SENSe] :FEED:SOURce? |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Inputs

Sets the measurement to use the input selections (RF, AREF, I/Q)

| | |
|----------------------|---|
| Key Path | Input/Output, Data Source |
| Example | FEED:DATA INP causes the measurement to look at the input selection |
| Notes | Does not auto return. |
| Readback | Inputs |
| Initial S/W Revision | Prior to A.02.00 |

Capture Buffer

Some WCDMA and demod measurements support this feature. This allows sharing of the raw data across certain measurements. If you want to make another measurement on the same signal, you would store that raw data using the "Current Meas -> Capture Buffer" key. Then the data is available for the next measurement to use. You must have raw data stored in the instrument memory before the Capture Buffer choice is available for use.

| | |
|----------------------|---|
| Key Path | Input/Output, Data Source |
| Example | FEED:DATA STOR causes stored measurement data to be used with a different measurement that supports this. |
| Notes | Does not auto return. This key is grayed out when you switch to a measurement that does not support this feature. |
| Dependencies | If you switch to a measurement that does not support this feature, then the instrument switches to use "Inputs" and grays out this key. If the grayed out key is pressed, it generates a message. |
| Readback | Stored Data |
| Initial S/W Revision | Prior to A.02.00 |

Current Meas -> Capture Buffer

Pressing this key stores the raw data of one measurement in the internal memory of the instrument where it can then be used by a different measurement by pressing "Stored Data". When raw data is stored, then the data source selection switch automatically changes to "Stored Data". Stored raw data cannot be directly accessed by a user. There is no save/recall function to save the raw data in an external media. However if you want to get the stored raw data, you must first perform a measurement using the stored raw data. Now you can access the used raw data, which is the same as stored raw data, using the FETch or READ commands.

| | |
|----------|----------------------------------|
| Key Path | Input/Output, Data Source |
|----------|----------------------------------|

| | |
|-------------------------------------|---|
| Remote Command | [:SENSe] :FEED:DATA:STORe |
| Example | FEED:DATA:STOR stores recorded data |
| Notes | This is command only, there is no query |
| Dependencies | Grayed out in the SA measurement. |
| Backwards Compatibility SCPI | [:SENSe] :FEED:SOURce:STORe |
| Initial S/W Revision | Prior to A.02.00 |

Corrections

This key accesses the Amplitude Corrections menu.

Amplitude Corrections arrays can be entered, sent over SCPI, or loaded from a file. They allow you to correct the response of the analyzer for various use cases. The X-series supports four separate Corrections arrays, each of which can contain up to 2000 points. They can be turned on and off individually and any or all can be on at the same time.

Trace data is in absolute units and corrections data is in relative units, but we want to be able to display trace data at the same time as corrections data. Therefore we establish a reference line to be used while building or editing a Corrections table. The reference line is halfway up the display and represents 0 dB of correction. It is labeled "0 dB CORREC". It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it.

In zero span, where the frequency is always the center frequency of the analyzer, we apply the (interpolated) correction for the center frequency to all points in the trace. In the event where there are two correction amplitudes at the center frequency, we apply the first one in the table.

Note that the corrections are applied as the data is taken; therefore, a trace in **View** (Update Off) will not be affected by changes made to the corrections table after the trace is put in **View**.

On the RF Input/Output panel, there are two full-duplex RF ports (RFIO1 and RFIO2), RF Input and RF Output. When RF Input is selected, it will correspond to one input port from two half-duplex RF ports (RFIO3 and RFIO4), and when RF Output is selected, it will correspond to one output port from two half-duplex RF ports (RFIO3 and RFIO4). So there are 8 sets of corrections in all that can be applied to the RF ports. Ports cannot share the same set of corrections but a single port can have multiple corrections applied to it. The correction data is applied to incoming signals as well as transmitted signals and is in the form of a list of spot frequencies and amplitude correction levels.

| Key Path | Input/Output, Corrections |
|--------------|--|
| Mode | SA, I/Q Analyzer, Phase Noise, VXA, RTSA, EMI Receiver, DVB-T/H, DTMB, DVB-T/H, DTMB, W-CDMA, LTE & LTE-Adv FDD, LTE & LTE-Adv TDD, Sequence Analyzer, BTooth, WLAN |
| Dependencies | This key will only appear if you have the proper option installed in your instrument. Amplitude correction may not be available in all modes; if a mode does not support amplitude correction, the Corrections key should be blanked while in that mode. If an application supports |

| | |
|--------------------------|---|
| | corrections but the current measurement does not, then the key should be grayed out in that measurement |
| Preset | Corrections arrays are reset (deleted) by Restore Input/Output Defaults. They survive shutdown and restarting of the analyzer application, which means they will survive a power cycle. |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | x.14.50 |

Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

| | |
|--------------------------|---|
| Key Path | Input/Output, Corrections |
| Mode | SA, I/Q Analyzer, Phase Noise, VXA, RTSA, EMI Receiver, DVB-T/H, DTMB, DVB-T/H, DTMB, W-CDMA, LTE & LTE-Adv FDD, LTE & LTE-Adv TDD, Sequence Analyzer, BTooth |
| Notes | The selected correction is remembered even when not in the correction menu. |
| Preset | Set to Correction 1 by Restore Input/Output Defaults |
| Readback | Correction 1 Correction 2 Correction 3 Correction 4 Correction 5 Correction 6 Correction 7 Correction 8 |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | x.14.50 |

Correction On/Off

Turning the Selected Correction from the OFF state to the ON state allows the values in it to be applied to the data. This state transition also automatically turns on "Apply Corrections" (sets it to ON), otherwise the correction would not take effect.

A new sweep is initiated if an amplitude correction is switched on or off. Note that changing, sending or loading corrections data does NOT directly initiate a sweep, however in general these operations will turn corrections on, which DOES initiate a sweep.

| | |
|-----------------------|---|
| Key Path | Input/Output, Corrections |
| Remote Command | <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8[:STATe] ON OFF 1 0</code> <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8[:STATe]?</code> |
| Example | <code>SENS:CORR:CSET1 ON</code> |
| Dependencies | Changing this from the OFF state to the ON state automatically turns on "Apply Corrections". Only the first correction array (Correction 1) supports antenna units. When this array is turned on, and it contains an Antenna Unit other than "None", the Y Axis Unit of the analyzer is forced to that Antenna Unit. All other Y Axis Unit choices are grayed out. Note that this means that a correction file with an Antenna Unit can only be loaded into the |

| | |
|-------------------------------|--|
| | Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated. This command will generate an "Option not available" error unless you have the proper option installed in your instrument. |
| Preset | Not affected by a Preset. Set to OFF by Restore Input/Output Defaults |
| State Saved | Saved in instrument state. |
| Backwards Compatibility Notes | Unlike legacy analyzers, Preset does not turn Corrections off (Restore Input/Output Defaults does). |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

Properties

Accesses a menu that lets you set the properties of the selected correction.

| | |
|----------------------|----------------------------------|
| Key Path | Input/Output, Corrections |
| Initial S/W Revision | A.02.00 |

Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

| | |
|--------------------------|---|
| Key Path | Input/Output, Corrections |
| Mode | SA, I/Q Analyzer, Phase Noise, VXA, RTSA, EMI Receiver, DVB-T/H, DTMB, DVB-T/H, DTMB, W-CDMA, LTE & LTE-Adv FDD, LTE & LTE-Adv TDD, Sequence Analyzer, BTooth |
| Notes | The selected correction is remembered even when not in the correction menu. |
| Preset | Set to Correction 1 by Restore Input/Output Defaults |
| Readback | Correction 1 Correction 2 Correction 3 Correction 4 Correction 5 Correction 6 Correction7 Correction8 |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | x.14.50 |

Antenna Unit

For devices (like antennas) that make measurements of field strength or flux density, the correction array should contain within its values the appropriate conversion factors such that, when the data on the analyzer is presented in dB μ V, the display is calibrated in the appropriate units. The "Antenna Unit" used for the conversion is contained within the corrections array database. It may be specified or loaded in from an external file or SCPI.

When an array with an Antenna Unit other than "None" is turned on, the Y Axis Unit of the analyzer is forced to that unit. When this array is turned on, and it contains an Antenna Unit other than "None", the Y Axis Unit of the analyzer is forced to that Antenna Unit., and all other Y Axis Unit choices are grayed out.

Antenna Unit does not appear in all Modes that support Corrections. Only the modes listed in the Mode row of the table below support Antenna Units.

| | |
|---------------------------------|---|
| Key Path | Input/Output, Corrections, Properties |
| Mode | SA, I/Q Analyzer, Phase Noise, VXA, RTSA, EMI Receiver, DVB-T/H, DTMB, DVB-T/H, DTMB, W-CDMA, LTE & LTE-Adv FDD, LTE & LTE-Adv TDD, Sequence Analyzer, BTooth |
| Remote Command | [:SENSe] :CORRection:CSET[1]:ANTenna[:UNIT] GAUSS PTES1a UVM UAM UA NOConversion [:SENSe] :CORRection:CSET[1]:ANTenna[:UNIT] ? |
| Example | CORR:CSET:ANT GAUS |
| Dependencies | Only the first correction array (Correction 1) supports antenna units. Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated. |
| Preset | Unaffected by Preset. Set to NOC by Restore Input/Output Defaults |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | x.14.50 |

None

Selects no antenna unit for this Correction set. Thus no Y Axis unit will be forced.

| | |
|-----------------------------|--|
| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
| Example | :CORR:CSET:ANT NOC |
| Readback | "None" |
| Initial S/W Revision | A.02.00 |

dBµV/m

Sets the antenna unit to dBµV/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBµV/m and all other Y Axis Unit selections will be grayed out.

| | |
|-----------------------------|--|
| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
| Example | :CORR:CSET:ANT UVM |
| Readback | "dBµV/m" |
| Initial S/W Revision | A.02.00 |

dB μ A/m

Sets the antenna unit to dB μ A/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dB μ A/m and all other Y Axis Unit selections will be grayed out.

| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
|----------------------|---|
| Example | :CORR:CSET:ANT UVA |
| Readback | " dB μ A/m" |
| Initial S/W Revision | A.02.00 |

dBpT

Sets the antenna unit to dBpT. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBpT and all other Y Axis Unit selections will be grayed out.

| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
|----------------------|---|
| Example | :CORR:CSET:ANT PTES |
| Readback | "dBpT" |
| Initial S/W Revision | A.02.00 |

DBG

Sets the antenna unit to DBG. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to DBG and all other Y Axis Unit selections will be grayed out.

| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
|----------------------|---|
| Example | :CORR:CSET:ANT GAUS |
| Readback | " DBG" |
| Initial S/W Revision | A.02.00 |

dB μ A

Sets the antenna unit to dB μ A. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dB μ A and all other Y Axis Unit selections will be grayed out.

| Key Path | Input/Output, Corrections, Properties, Antenna Unit |
|----------------------|---|
| Example | :CORR:CSET:ANT UA |
| Readback | " dB μ A" |
| Initial S/W Revision | A.11.00 |

Frequency Interpolation

This setting controls how the correction values per-bucket are calculated. We interpolate between frequencies in either the logarithmic or linear scale.

This setting is handled and stored individually per correction set.

See ["Interpolation" on page 178](#)

| Key Path | Input/Output, Corrections, Properties |
|---------------------------------|--|
| Remote Command | <code>[:SENSe]:CORRection:CSET[1] 2 ... 8:X:SPACing LINear LOGarithmic</code> <code>[:SENSe]:CORRection:CSET[1] 2 ... 8:X:SPACing?</code> |
| Example | <code>CORR:CSET:X:SPAC LIN</code> |
| Preset | Unaffected by a Preset. Set to Linear by Restore Input/Output Defaults. |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

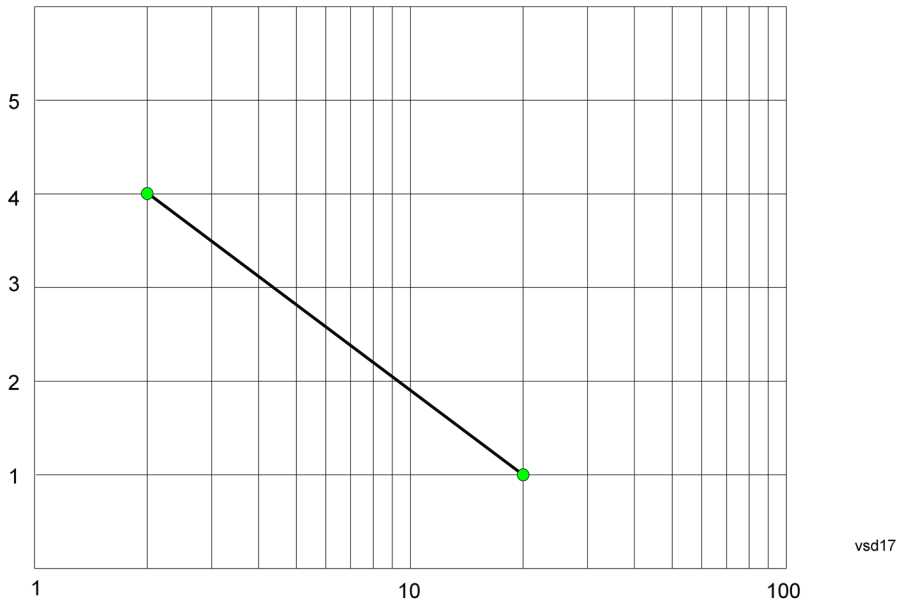
Interpolation

For each bucket processed by the application, all of the correction factors at the frequency of interest (center frequency of each bucket) are summed and added to the amplitude. All trace operations and post processing treat this post-summation value as the true signal to use.

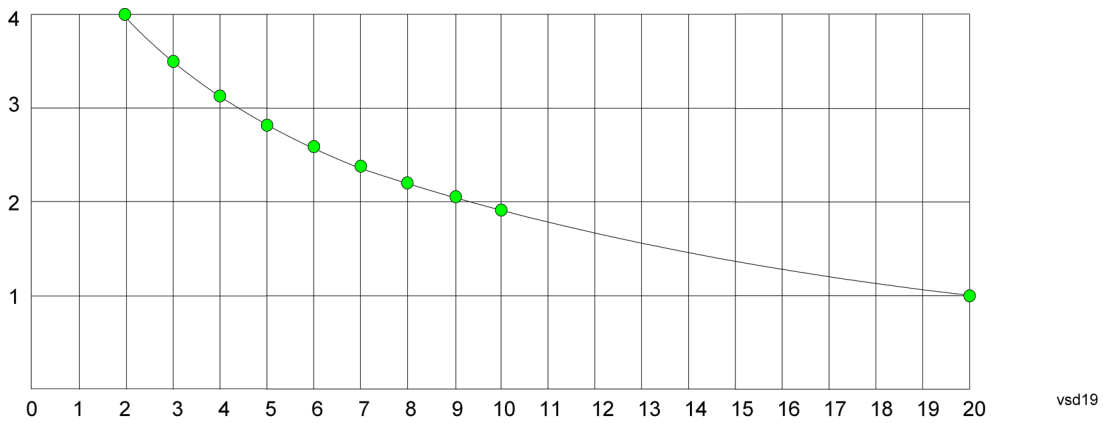
To effect this correction, the goal, for any particular start and stop frequency, is to build a correction trace, whose number of points matches the current Sweep Points setting of the instrument, which will be used to apply corrections on a bucket by bucket basis to the data traces.

For amplitudes that lie between two user specified frequency points, we interpolate to determine the amplitude value. You may select either linear or logarithmic interpolation between the frequencies.

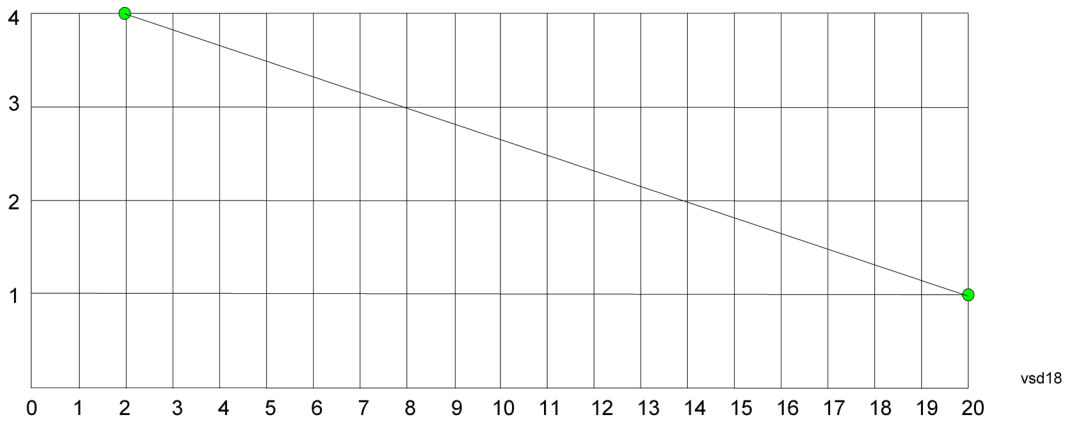
If we interpolate on a log scale, we assume that the line between the two points is a straight line on the log scale. For example, let's say the two points are (2,4) and (20,1). A straight line between them on a log scale looks like:



On a linear scale (like that of the spectrum analyzer), this translates to:



If we interpolate on a linear scale, we assume that the two points are connected by a straight line on the linear scale, as below:



The correction to be used for each bucket is taken from the interpolated correction curve at the center of the bucket.

Description

Sets an ASCII description field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to appear in a screen capture.

| Key Path | Input/Output, Corrections, Properties |
|--------------------------|--|
| Remote Command | <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:DESCRiption "text"</code> <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:DESCRiption?</code> |
| Example | <code>:CORR:CSET1:DESC "11941A Antenna correction"</code> |
| Notes | 45 chars max; may not fit on display if max chars used |
| Preset | Unaffected by a Preset. Set to empty by Restore Input/Output Defaults |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

Comment

Sets an ASCII comment field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to appear in a screen capture.

| Key Path | Input/Output, Corrections, Properties |
|--------------------------|--|
| Remote Command | <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:COMMent "text"</code> <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:COMMent?</code> |
| Example | <code>:CORR:CSET1:COMM "this is a comment"</code> |
| Notes | 60 chars max; may not fit on display if max chars used |
| Preset | Unaffected by Preset. Set to empty by Restore Input/Output Defaults |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

RF Port

Maps one of the sets of corrections to one of the IO ports.

| Key Path | Input/Output, Corrections, Properties |
|-----------------------|---|
| Mode | SEQAN |
| Remote Command | <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:RF:PORT RFIN RFIO1 RFIO2 </code> <code>RFOut GPSout GNSSout RFIO3 RFIO4</code> <code>[[:SENSe]:CORRection:CSET[1] 2 ... 8:RF:PORT?</code> |

| | |
|--------------------------|--|
| Example | :CORR:CSET:RF:PORT RFIN |
| Remote Command Notes | |
| Dependencies | RFIO1 and RFIO2 are not available in E6607C and E6630A GPSout (GNSSout) are only available in E6607C and E6630A |
| Couplings | |
| Preset | Unaffected by Preset. Set to RF by Restore Input/Output Defaults |
| State Saved | Saved in State |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RF Input

The port that the current corrections will be applied to.

| | |
|--------------------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT RFIN |
| Dependencies | Not available in E6607C |
| ReadBack | RF IN |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RFOut

The port that the current corrections will be applied to.

| | |
|--------------------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT RFO |
| Dependencies | Not available in E6607C |
| ReadBack | RFOut |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RFIO1

The port that the current corrections will be applied to. Pressing this key again allows the user access to the menu for specifying which internal device the corrections for RFIO 1 will be applied to.

| | |
|-----------------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Remote Command | [:SENSe] :CORRection:CSET [1] 2 ... 8 :RF:PORT:RFIO1 SOURce ANALyzer BOTH [:SENSe] :CORRection:CSET [1] 2 ... 8 :RF:PORT:RFIO1 ? |
| Example | :CORR:CSET:RF:PORT:RFIO1 BOTH |
| Preset | Both |
| State Saved | Saved in State |

Correct Source

Sets the corrections for the RFIO1 port to be applied to the source.

| | |
|-----------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO1 SOUR |
| Readback | "Correct Source" |

Correct Analyzer

Sets the corrections for the RFIO1 port to be applied to the analyzer.

| | |
|-----------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO1 ANAL |
| Readback | "Correct Analyzer" |

Correct Source and Analyzer

Sets the corrections for the RFIO1 port to be applied to both the source and the analyzer.

| | |
|-----------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO1 BOTH |
| Readback | "Correct Source and Analyzer" |

RFIO2

The port that the current corrections will be applied to. Pressing this key again allows the user access to the menu for specifying which internal device the corrections for RFIO 2 will be applied to.

| | |
|-----------------------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Remote Command | [:SENSe] :CORRection:CSET [1] 2 ... 8 :RF:PORT:RFIO2 SOURce ANALyzer BOTH [:SENSe] :CORRection:CSET [1] 2 ... 8 :RF:PORT:RFIO2 ? |

| | |
|-------------|-------------------------------|
| Example | :CORR:CSET:RF:PORT:RFIO2 BOTH |
| Preset | Both |
| State Saved | Saved in State |

Correct Source

Sets the corrections for the RFIO2 port to be applied to the source.

| | |
|----------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO2 SOUR |
| Readback | "Correct Source" |

Correct Analyzer

Sets the corrections for the RFIO2 port to be applied to the analyzer.

| | |
|----------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO2 ANAL |
| Readback | "Correct Analyzer" |

Correct Source and Analyzer

Sets the corrections for the RFIO2 port to be applied to both the source and the analyzer.

| | |
|----------|---|
| Key Path | Input/Output, Corrections, Properties, RF Port |
| Example | :CORR:CSET:RF:PORT:RFIO2 BOTH |
| Readback | "Correct Source and Analyzer" |

Edit

Invokes the integrated editing facility for this correction set.

When entering the menu, the editor window turns on, the selected correction is turned **On**, **Apply Corrections** is set to **On**, the amplitude scale is set to **Log**, and the Amplitude Correction ("Ampcor") trace is displayed. The actual, interpolated correction trace is shown in green for the selected correction. Note that since the actual interpolated correction is shown, the correction trace may have some curvature to it. This trace represents only the correction currently being edited, rather than the total, accumulated amplitude correction for all amplitude corrections which are currently on, although the total, accumulated correction for all corrections which are turned on is still applied to the data traces.

Because corrections data is always in dB, but the Y-axis of the analyzer is in absolute units, it is necessary to establish a reference line for display of the Corrections data. The reference line is halfway up the display and represents 0 dB of correction. It is labeled "0 dB CORREC". It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it. By definition all points are connected. If a gap is desired for corrections data, enter 0 dB.

Note that a well-designed Corrections array should start at 0 dB and end at 0 dB. This is because whatever the high end point is will be extended to the top frequency of the instrument, and whatever the low end point is will be extended down to 0 Hz. So for a Corrections array to have no effect outside its range, you should start and end the array at 0 dB.

NOTE

The table editor will only operate properly if the analyzer is sweeping, because its updates are tied to the sweep system. Thus, you should not try to use the editor in single sweep, and it will be sluggish during compute-intensive operations like narrow-span FFT sweeps.

When exiting the edit menu (by using the **Return** key or by pressing an instrument front-panel key), the editor window turns off and the Ampcor trace is no longer displayed; however, **Apply Corrections** remains **On**, any correction that was on while in the editor remains on, and the amplitude scale returns to its previous setting.

Corrections arrays are not affected by a Preset, because they are in the Input/Output system. They also survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.

When editing a correction, the editor remembers which correction and which element in the correction array you were editing, and returns you to that correction and that element when you return to the editor after leaving it.

| Key Path | Input/Output, Corrections |
|----------------------|---------------------------|
| Initial S/W Revision | A.02.00 |

Navigate

Lets you move through the table to edit the desired point.

| Key Path | Input/Output, Corrections, Edit |
|----------------------|---------------------------------------|
| Notes | There is no value readback on the key |
| Min | 1 |
| Max | 2000 |
| Initial S/W Revision | A.02.00 |

Frequency

Lets you edit the frequency of the current row.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections, Edit |
| Notes | There is no value readback on the key. |
| Min | 0 |
| Max | 1 THz |
| Initial S/W Revision | A.02.00 |

Amplitude

Lets you edit the Amplitude of the current row.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections, Edit |
| Notes | There is no value readback on the key. |
| Min | -1000 dB |
| Max | 1000 dB |
| Initial S/W Revision | A.02.00 |

Insert Point Below

Inserts a point below the current point. The new point is a copy of the current point and becomes the current point. The new point is not yet entered into the underlying table, and the data in the row is displayed in light gray.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections, Edit |
| Initial S/W Revision | A.02.00 |

Delete Point

Deletes the currently-selected point, whether or not that point is being edited, and selects the Navigate functionality. The point following the currently-selected point (or the point preceding if there is none) will be selected.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections, Edit |
| Initial S/W Revision | A.02.00 |

Delete Correction

Deletes the correction values for this set. When this key is pressed a prompt is placed on the screen that says "Please press Enter or OK key to delete correction. Press ESC or Cancel to close this dialog." The deletion is only performed if you press OK or Enter.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections |
| Remote Command | [:SENSe] :CORRection:CSET [1 2 ... 6 :DELete |
| Example | CORR:CSET:DEL CORR:CSET1:DEL CORR:CSET4:DEL |
| Notes | Pressing this key when no corrections are present is accepted without error. |
| Initial S/W Revision | A.02.00 |

Apply Corrections

Applies amplitude corrections, which are marked as ON to the measured data. If this is set to OFF, then no amplitude correction sets will be used, regardless of their individual on/off settings. If set to ON, the corrections that are marked as ON (see "[Correction On/Off](#)" on page 174) are used.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections |
| Remote Command | [:SENSe] :CORRection:CSET:ALL [:STATe] ON OFF 1 0 [:SENSe] :CORRection:CSET:ALL [:STATe] ? |
| Example | SENS:CORR:CSET:ALL OFF This command makes sure that no amplitude corrections are applied, regardless of their individual on/off settings. |
| Preset | Not affected by Preset. Set to OFF by Restore Input/Output Defaults |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.02.00 |

Delete All Corrections

Erases all correction values for all 4 Amplitude Correction sets.

When this key is pressed a prompt is placed on the screen that says "Please press Enter or OK key to delete all corrections. Press ESC or Cancel to close this dialog." The deletion is only performed if you press OK or Enter.

| | |
|----------------------|--|
| Key Path | Input/Output, Corrections |
| Remote Command | [:SENSe] :CORRection:CSET:ALL:DELete |
| Example | CORR:CSET:ALL:DEL |
| Initial S/W Revision | A.02.00 |

Remote Correction Data Set Commands

This section describes the remote (SCPI) commands used to put values into correction sets. See the correction / table editor section of the Input/Output section for the information on front panel entry of correction data.

"Set (Replace) Data (Remote Command Only)" on page 187

"Merge Correction Data (Remote Command Only)" on page 187

Set (Replace) Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas.

The values sent in the command will totally replace all existing correction points in the specified set.

An Ampcor array can contain 2000 points maximum.

| | |
|---------------------------------|--|
| Remote Command | <code>[:SENSe] :CORRection:CSET[1] 2 ... 8:DATA <freq>, <ampl>, . . .</code> <code>[:SENSe] :CORRection:CSET[1] 2 ... 8:DATA?</code> |
| Example | <code>CORR:CSET1:DATA 10000000, -1.0, 20000000, 1.0</code> This defines two correction points at (10 MHz, -1.0 dB) and (20 MHz, 1.0 dB) for correction set 1. |
| Preset | Empty after Restore Input/Output Defaults. Survives a shutdown or restart of analyzer application (including a power cycle). |
| State Saved | Saved in instrument state. |
| Min | Freq: 0 Hz Amptd: -1000 dBm |
| Max | Freq: 1 THz Amptd: +1000 dBm |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

Merge Correction Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas. The difference between this command and Set Data is that this merges new correction points into an existing set.

Any new point with the same frequency as an existing correction point will replace the existing point's amplitude with that of the new point.

An Ampcor array can contain 2000 total points, maximum.

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe] :CORRection:CSET[1] 2 ... 8:DATA:MERGe <freq>, <ampl>, ...</code> |
| Example | <code>CORR:CSET1:DATA:MERGE 15000000, -5.0, 25000000, 5.0</code> This adds two correction points at (15 MHz, -5.0 dB) and (25 MHz, 5.0 dB) to whatever values already exist in correction set 1. |

| | |
|--------------------------|--|
| Preset | Empty after Restore Input/Output Defaults. Survives shutdown/restart of analyzer application (including power cycle) |
| Min | Freq: 0 Hz Amptd: -1000 dBm |
| Max | Freq: 1 THz Amptd: +1000 dBm |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.14.00 |

Freq Ref In

Specifies the frequency reference as being the internal reference at the rear panel input labeled EXT REF IN, a 1 pulse per second signal at the EXT REF IN input, external reference or sensing the presence of a signal at the EXT REF IN input.

When the frequency reference is set to internal, the internal 10 MHz reference is used even if an external reference is connected.

When the frequency reference is set to external, the instrument will use the external reference. However, if there is no external signal present, or it is not within the proper amplitude range, a condition error message is generated. When the external signal becomes valid, the error is cleared.

When the frequency reference is set to Pulse, the instrument expects a 1 pulse per second signal at the EXT REF IN input. The instrument uses this signal to adjust the frequency of the internal reference.

If Sense is selected, the instrument checks whether a signal is present at the external reference connector. If it senses a signal within 5 ppm of the External Ref Freq (as set on the **External Ref Freq** softkey), it will automatically switch to the external reference. If it senses a 1 pulse per second signal, it enters Pulse mode, wherein the signal is used to adjust the internal reference. When no signal is present, it automatically switches to the internal reference. No message is generated as the reference switches between pulse, external and internal. The monitoring of the external reference occurs approximately on 1 millisecond intervals, and never occurs in the middle of a measurement acquisition, only at the end of the measurement (end of the request).

If for any reason the instrument's frequency reference is not able to obtain lock, Status bit 1 in the Questionable Frequency register will be true and a condition error message is generated. When lock is regained, Status bit 1 in the Questionable Frequency register will be cleared and the condition error will be cleared.

If an external frequency reference is being used, you must enter the frequency of the external reference if it is not exactly 10 MHz. The External Ref Freq key is provided for this purpose.

| Key Path | Input/Output |
|-----------------------|--|
| Remote Command | [:SENSe] :ROSCillator :SOURCE :TYPE INTernal EXTernal SENSE PULSE [:SENSe] :ROSCillator :SOURCE :TYPE ? |
| Dependencies | The PULSE parameter, and support of the 1 pps signal at the EXT REF IN input, are not available in firmware prior to A.13.00. They are also not available in some model numbers. If not available, the |

| | |
|-------------------------------|--|
| | Pulse key will be blank, and sending the PULSe parameter via SCPI will generate an error: |
| Preset | This is unaffected by a Preset but is set to SENSE on a "Restore Input/Output Defaults" or "Restore System Defaults->All". |
| State Saved | Saved in instrument state. |
| Status Bits/OPC dependencies | STATus:QUEStionable:FREQuency bit 1 set if unlocked. |
| Backwards Compatibility Notes | Freq Ref In was not saved in state in the legacy instruments. It is a part of state in the X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

| | |
|-------------------------------|---|
| Remote Command | <code>[:SENSe] :ROSCillator:SOURce?</code> |
| Notes | <p>The query <code>[SENSe]:ROSCillator:SOURce?</code> returns the current switch setting. This means:</p> <ol style="list-style-type: none"> 1. If it was set to SENSE but there is no external reference nor 1 pps signal so the instrument is actually using the internal reference, then this query returns INTERNAL and not SENSE. 2. If it was set to SENSE and there is an external reference present, the query returns EXTERNAL and not SENSE. 3. If it was set to SENSE and there is a 1 pps signal present, the query returns PULSe and not SENSE. 4. If it was set to EXTERNAL, then the query returns "EXTERNAL" 5. If it was set to INTERNAL, then the query returns "INTERNAL". 6. If it was set to PULSe, then the query returns "PULSe" |
| Preset | SENSe |
| Backwards Compatibility Notes | <p>The query <code>[:SENSe] :ROSCillator:SOURce?</code> was a query-only command in ESA which always returned whichever reference the instrument was using. The instrument automatically switched to the ext ref if it was present.</p> <p>In PSA (which had no sensing) the command <code>[:SENSe] :ROSCillator:SOURce</code> set the reference (INT or EXT), so again its query returned the actual routing.</p> <p>Thus the query form of this command is 100% backwards compatible with both instruments.</p> |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe] :ROSCillator:SOURce INTERNAL EXTERNAL</code> |
| Notes | For PSA compatibility the command form is provided and is directly mapped to <code>[:SENSe] :ROSCillator:SOURce:TYPE</code> |
| Initial S/W Revision | Prior to A.02.00 |

Sense

If Sense is selected, the instrument checks whether a signal is present at the external reference connector. If it senses a signal within 5 ppm of the External Ref Freq (as set on the **External Ref Freq** softkey), it will use this signal as an External Reference. If it senses a 1 pulse per second signal, it will use this signal to adjust the internal reference by adjusting the User setting of the Timebase DAC. When no signal is present, it automatically switches to the internal reference.

| | |
|---------------------------------|--|
| Key Path | Input/Output, Freq Ref In |
| Example | :ROSC:SOUR:TYPE SENS |
| Couplings | If set to SENSE and the analyzer senses a 1 pulse per second signal, it sets the System, Alignments, Timebase DAC setting to "User". This setting survives Preset and Power Cycle but is set to "Calibrated" on a System, Restore Defaults, Align or a System, Restore Defaults, All |
| Readback | Sense |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

Internal

The internal reference is used. A 1 pps signal at the EXT REF IN port, or a signal there between 1 and 50 MHz, will cause a warning triangle to appear in the settings panel next to the word "INTERNAL", but will otherwise be ignored.

| | |
|---------------------------------|----------------------------------|
| Key Path | Input/Output, Freq Ref In |
| Example | :ROSC:SOUR:TYPE INT |
| Readback | Internal |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

External

The external reference is used.

| | |
|-----------------------------|----------------------------------|
| Key Path | Input/Output, Freq Ref In |
| Example | :ROSC:SOUR:TYPE EXT |
| Readback | External |
| Initial S/W Revision | Prior to A.02.00 |

Ext Ref Freq

This key tells the analyzer the frequency of the external reference. When the external reference is in use (either because the reference has been switched to External or because the Reference has been switched

to Sense and there is a valid external reference present) this information is used by the analyzer to determine the internal settings needed to lock to that particular external reference signal.

For the instrument to stay locked, the value entered must be within 5 ppm of the actual external reference frequency. So it is important to get it close, or you risk an unlock condition.

Note that this value only affects the instrument's ability to lock. It does not affect any calculations or measurement results. See "Freq Offset" in the Frequency section for information on how to offset frequency values.

| Key Path | Input/Output, Freq Ref In |
|--------------------------|--|
| Remote Command | <code>[:SENSE] :ROSCillator:EXTernal:FREQuency <freq></code> <code>[:SENSE] :ROSCillator:EXTernal:FREQuency?</code> |
| Example | ROSC:EXT:FREQ 20 MHz sets the external reference frequency to 20 MHz, but does not select the external reference. ROSC:SOUR:TYPE EXT selects the external reference. |
| Dependencies | Still available with Internal or Pulse selected, to allow setup for when External is in use. However, the setting has no effect if the Internal Reference is in use (Freq Ref In set to Internal, Pulse, or SENSE:INT or SENSE:PULSE). |
| Preset | This is unaffected by a Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| Default Unit | Hz |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

RF Output & Test Set Config

The RF Output & Test Set Config key allows you to set the RF Output Port and multipoint adapter unit which is connected to the instrument by USB for download of calibration data and additional control.

This menu also allows you to set Trigger Config which is used to set the input/output type of the 4 Bi-directional Trigger ports.

| Key Path | Input/Output |
|----------------------|---|
| Preset | All settings under this key are returned to their default state when Restore Input/Output Defaults is pressed. |
| State Saved | Saved in State |
| Initial S/W Revision | A.09.49 |

RF Output

Specifies the RF Output Port used.

Switching from the RF Output port to one of the RFIO ports changes the transmitter performance of the instrument.

| | |
|--------------------------|--|
| Key Path | Input/Output, RF Output & Test Set Config |
| Remote Command | [:SENSe] :FEED:RF:PORT:OUTPut RFOut RFIO1 RFIO2 GPSout GNSSout RFIO3 RFIO4 [:SENSe] :FEED:RF:PORT:OUTPut? |
| Example | :FEED:RF:PORT:OUTP RFIO1 |
| Preset | This is unaffected by Mode Preset but is set to RFOut on a "Restore Input/Output Defaults" or "Restore System Defaults -> All" |
| State Saved | Saved in State |
| Readback | The current RF Output Port selected is read back to this key |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RF Output

The RF port that will be used for the current output.

| | |
|--------------------------|---|
| Key Path | Input/Output, RF Output & Test Set Config, RF Output |
| Example | :FEED:RF:PORT:OUTP RFO |
| Notes | If RF Output is selected as RF Output Port, you need to choose the settings in the Half Duplex Config menu to determine which port (RFIO3 or RFIO4) will be used. |
| ReadBack | RF Output |
| Initial S/W Revision | A.05.01 |
| Modified at S/W Revision | A.14.00 |

RFIO1

The RF port that will be used for the current output

| | |
|----------------------|---|
| Key Path | Input/Output, RF Output & Test Set Config, RF Output |
| Example | :FEED:RF:PORT:OUTP RFIO1 |
| Dependencies | Not available in E6607C. |
| ReadBack | RFIO1 |
| Initial S/W Revision | A.05.01 |

RFIO2

The RF port that will be used for the current output

| | |
|----------|---|
| Key Path | Input/Output, RF Output & Test Set Config, RF Output |
|----------|---|

| | |
|----------------------|--------------------------|
| Example | :FEED:RF:PORT:OUTP RFIO2 |
| Dependencies | Not available in E6607C. |
| ReadBack | RFIO2 |
| Initial S/W Revision | A.05.01 |

HalfDuplex Config

The HalfDuplex Config key allows you to set “RF Input” of RF Input Port menu and ”RF Output” of RF Output Port menu, which will correspond to RFIO3 and RFIO4.

| | |
|----------------------|--|
| Key Path | Input/Output, RF Output & Test Set Config |
| State Saved | Saved in State |
| Initial S/W Revision | A.14.00 |

RF Input

Specify the RF Input port from RFIO3 and RFIO4.

| | |
|-----------------------|--|
| Key Path | Input/Output, RF Output & Test Set Config, HalfDuplex Config |
| Remote Command | [:SENSe] :HDUPlex:PORT:INPut RFIO3 RFIO4 |
| Example | :HDUPlex:PORT:INPut RFIO3 :HDUPlex:PORT:INPut? |
| Dependencies | If RFIO3 is selected as “RF Output”, then “RF Input” will be set to RFIO4 automatically. And if RFIO4 is selected as “RF Output”, “RF Input” will be set to RFIO3 automatically. |
| Preset | RFIO3 |
| State Saved | Saved in State |
| Initial S/W Revision | A.14.00 |

RF Output

Specify the RF Output port from RFIO3 and RFIO4.

| | |
|-----------------------|--|
| Key Path | Input/Output, RF Output & Test Set Config, HalfDuplex Config |
| Remote Command | [:SENSe] :HDUPlex:PORT:OUTPut RFIO3 RFIO4 |
| Example | :HDUPlex:PORT:OUTPut RFIO3 :HDUPlex:PORT:OUTPut? |
| Dependencies | If RFIO3 is selected as “RF Input”, then “RF Output” will be set to RFIO4 automatically. And if RFIO4 is selected as “RF Input”, “RF Output” will be set to RFIO3 automatically. |

| | |
|----------------------|----------------|
| Preset | RFIO4 |
| State Saved | Saved in State |
| Initial S/W Revision | A.14.00 |

Output Config

Accesses keys that configure various output settings, like the frequency reference output, trigger output and analog output.

| Key Path | Input/Output |
|-------------------------------|--|
| Backwards Compatibility Notes | In ESA there was not a user interface to enable the Video Output (Analog Output), Trigger Output, or Gate Output. In the X-Series each of these physical connectors requires configuration, thus the user interface has been added for X-Series, along with the potential for an output you think is always on to be switched off. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Out

Select the type of output signal that will be output from the Trig 1 Out, or Trig 2 Out connectors.

| Key Path | Input/Output, Output Config |
|-----------------------------|---|
| Remote Command | :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut HSWP MEASuring MAIN GATE GTRigger OEVen SPOint SSweep SSETtled S1Marker S2Marker S3Marker S4Marker OFF :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut? |
| Example | TRIG:OUTP HSWP TRIG2:OUTP GATE |
| Dependencies | The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger 2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF. |
| Preset | Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

Polarity

Sets the output to the Trig 1 Out, or Trig 2 Out, connector to trigger on either the positive or negative polarity.

| | |
|-----------------------------|--|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Remote Command | :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut:POLarity POSitive NEGative :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut:POLarity? |
| Example | TRIG1:OUTP:POL POS |
| Preset | This is unaffected by a Preset but is set to POSitive on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

Off

Selects no signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

| | |
|-----------------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

Sweeping (HSWP)

Selects the Sweeping Trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector when a measurement is made. This signal has historically been known as "HSWP" (High = Sweeping), and is 5 V TTL level with 50 ohm output impedance.

| | |
|-----------------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP HSWP |
| Readback | Sweeping |
| Initial S/W Revision | Prior to A.02.00 |

Measuring

Selects the Measuring trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector. This signal is true while the Measuring status bit is true.

| | |
|-----------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
|-----------------|---|

| | |
|----------------------|------------------|
| Example | TRIG1:OUTP MEAS |
| Readback | Measuring |
| Initial S/W Revision | Prior to A.02.00 |

Main Trigger

Selects the current instrument trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP MAIN |
| Readback | Main Trigger |
| Initial S/W Revision | Prior to A.02.00 |

Gate Trigger

Selects the gate trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector. This is the source of the gate timing, not the actual gate signal.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP GTR |
| Readback | Gate Trigger |
| Initial S/W Revision | Prior to A.02.00 |

Gate

Selects the gate signal to be output to the Trig 1 Out, or Trig 2 Out, connector. The gate signal has been delayed and its length determined by delay and length settings. When the polarity is positive, a high on the Trig 1 Out, or Trig 2 Out, represents the time the gate is configured to pass the signal.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP GATE |
| Readback | Gate |
| Initial S/W Revision | Prior to A.02.00 |

Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 Out, or Trig 2 Out, connector when performing swept spectrum analysis. When the polarity is positive, this output goes high during the time the analyzer is sweeping past the first point (Point 0) and every other following trace point. The opposite is true if the polarity is negative.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP OEV |
| Readback | Odd/Even |
| Initial S/W Revision | Prior to A.02.00 |

Trig Out

Select the type of output signal that will be output from the Trig 1 Out, or Trig 2 Out connectors.

| | |
|-----------------------|---|
| Key Path | Input/Output, Output Config |
| Remote Command | :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut HSWP MEASuring MAIN GATE GTRigger OEVen SPOint SSWeep SSEtTled S1Marker S2Marker S3Marker S4Marker OFF :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut? |
| Example | TRIG:OUTP HSWP TRIG2:OUTP GATE |
| Dependencies | The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger 2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF. |
| Preset | Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All" |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

Off

Selects no signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | TRIG1:OUTP OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

Source Marker 1

Trigger output at marker 1 in current playing Waveform file.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | :TRIG1:OUTP S1M |
| ReadBack | Marker 1 |
| Initial S/W Revision | A.05.01 |

Source Marker 2

Trigger output at marker 2 in current playing Waveform file.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | :TRIG1:OUTP S2M |
| ReadBack | Marker 2 |
| Initial S/W Revision | A.05.01 |

Source Marker 3

Trigger output at marker 3 in current playing Waveform file.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | :TRIG1:OUTP S3M |
| ReadBack | Marker 3 |
| Initial S/W Revision | A.05.01 |

Source Marker 4

Trigger output at marker 4 in current playing Waveform file.

| | |
|----------------------|---|
| Key Path | Input/Output, Output Config, Trig 1/2 Output |
| Example | :TRIG1:OUTP S4M |
| ReadBack | Marker 4 |
| Initial S/W Revision | A.05.01 |

Analog Out

This menu lets you control which signal is fed to the “Analog Out” connector on the analyzer rear panel.

See ["More Information" on page 199](#)

| | |
|----------------|--|
| Key Path | Input/Output, Output Config |
| Remote Command | :OUTPut:ANALog OFF SVIDeo LOGVideo LINVideo DAUDio |

| | |
|-------------------------------|--|
| | :OUTPut:ANALog? |
| Example | OUTP:ANAL SVIDeo ! causes the analog output type to be Screen Video |
| Preset | This is unaffected by Preset but is set to DAUDio on a "Restore Input/Output Defaults" or "Restore System Defaults->All |
| Preset | OFF |
| State Saved | Saved in Input/Output State |
| Readback line | 1-of-N selection [variable] |
| Backwards Compatibility Notes | Prior to A.04.00, OFF was the default functionality except when in the Analog Demod application or with Tune and Listen, in which case it was DAUDio, and there was no selection menu. So for backwards compatibility with earlier X-Series firmware versions, Auto (:OUTP:ANAL:AUTO ON) will duplicate the prior behavior. The DNWB and SANalyzer parameters, which were legal in PSA but perform no function in the X-Series, are accepted without error. |
| Initial S/W Revision | A.04.00 |

More Information

The table below gives the range for each output.

| Analog Out | Nominal Range exc. (10% overrange) | Scale Factor | Notes |
|--------------|--|-----------------|---|
| Off | 0 V | | |
| Screen Video | 0 – 1 V open circuit | 10%/division | 8566 compatible |
| Log Video | 0 – 1 V terminated | 1/(192.66 dB/V) | dB referenced to mixer level, 1V out for –10 dBm at the mixer. |
| Linear Video | 0 – 1 V terminated | 100%/V | Linear referenced to Ref Level, 1 V out for RF envelope at the Ref Level. |
| Demod Audio | (varies with analyzer setting) | | |

Auto

Selects the Auto state for the Analog Output menu. In this state, the Analog Output will automatically be set to the most sensible setting for the current mode or measurement.

If you make a selection manually from the Analog Out menu, this selection will remain in force until you change it (or re-select Auto), even if you go to a mode or measurement for which the selected output does not apply.

| | |
|----------------|---|
| Key Path | Input/Output, Output Config, Analog Out |
| Remote Command | OUTPut:ANALog:AUTO OFF ON 0 1 |

| | |
|----------------------|-----------------------------|
| | OUTPut :ANALog:AUTO? |
| Example | OUTP:ANAL:AUTO ON |
| Preset | ON |
| State Saved | Saved in Input/Output State |
| Initial S/W Revision | A.04.00 |

Off

Turns off the analog output.

| | |
|----------------------|--|
| Key Path | Input/Output, Output Config, Analog Out |
| Example | OUTP:ANAL OFF ! causes the analog output to be off |
| Readback Text | Off |
| Initial S/W Revision | A.04.00 |

LISN Control

Enables you to access LISN related functions. LISN control is only available with option LSN indicating that the LISN IO board is installed. This is a remote query command only.

V-network (Remote Command Only)

Enables you to select the V-network that is controlled via the AUX IO port.

| | |
|-----------------------|---|
| Remote Command | INPut [1] 2:LISN[:TYPE] FOURphase ESH2Z5 ENV216 OFF INPut [1] 2:LISN[:TYPE] ? |
| Example | :INP:LISN FOUR |
| Notes | FOURPhase and ESH2-Z5 R&S ESH2-Z5 (four phases and protective earth are controllable) ENV216 R&S ENV216 (two phases and highpass are controllable) OFF Remote control deactivated This query will return :- FOUR when ESH2-Z5 is selected. |
| Preset | Set to off on a "Restore Input/Output Defaults" |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.14.50 |

Phase (Remote Command Only)

This command enables you to select the phase of the V-network that is used, which is controlled via the AUX IO port. The permissible selection depends on the selected V-network.

| | |
|-----------------------------|--|
| Remote Command | INPut [1] 2:LISN:PHASe L1 L2 L3 N INPut [1] 2:LISN:PHASe? |
| Example | :INP:LISN:PHAS L1 |
| Couplings | L2, L3 keys are grayed out when ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “-224, Illegal parameter value; must apply ESH2Z5 to make this phase available” warning. |
| Preset | Set to N on a "Restore Input/Output Defaults" |
| State Saved | Saved in instrument state |
| Range | Phase N Phase L1 Phase L2 Phase L3 Only one phase can be selected. |
| Initial S/W Revision | A.14.50 |

150 kHz Highpass (Remote Command Only)

Controls highpass setting on the V-network.

| | |
|-----------------------------|--|
| Remote Command | INPut [1] 2:LISN:FILTer:HPAS[:STATe] ON OFF INPut [1] 2:LISN:FILTer:HPAS[:STATe]? |
| Example | :INP:LISN:FILT:HPAS ON |
| Dependencies | Only available for ENV216 V-network . This key is grayed out when a V-network that is not ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflicts; LISN function not available” warning. |
| Preset | Set to off on a "Restore Input/Output Defaults" |
| State Saved | Saved in instrument state |
| Range | ON OFF |
| Initial S/W Revision | A.14.50 |

Protective Earth (Remote Command Only)

Enables you to set the Protective Earth setting that is controlled via the AUX IO port.

| | |
|-----------------------|---|
| Remote Command | INPut [1] 2:LISN:PEARth GROunded FLOating INPut [1] 2:LISN:PEARth? |
| Example | :INP:LISN:PEAR GRO |
| Dependencies | Only available for ESH2Z5. This key is grayed out when a v-network other than ESH2Z5 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is |

| | |
|----------------------|---|
| | sent, this same message is generated as part of a “-221, Settings conflict; LISN function not available” warning. |
| Preset | Set to GRO on a "Restore Input/Output Defaults" |
| State Saved | Saved in instrument state |
| Range | GRO FLO |
| Initial S/W Revision | A.14.50 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

5 Mode Functions

Mode

The Mode key allows you to select the available measurement applications or “Modes”. Modes are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each application software product is ordered separately by Model Number and must be licensed to be available. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

NOTE

Key operation can be different between modes. The information displayed in Help is about the current mode.

To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

For more information on Modes, preloading Modes, and memory requirements for Modes,

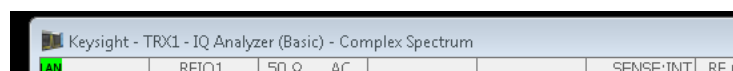
see ["More Information" on page 205](#)

| Key Path | Front-panel key |
|-------------------------------------|---|
| Remote Command | :INSTrument[:SElect] SA RTSA SEQAN EMI BASIC WCDMA EDGE GSM WIMAXOFDMA VSA PNOISE NFIGure ADEMOD BTooth TDSCDMA CDMA2K CDMA1XEV LTE LTE TDD LTEAFDD LTEATDD MSR DVB DTMB DCTV ISDBT CMMB WLAN CWLAN CWIMAXOFDM WIMAXFIXED IDEN RLC SCPI LC VSA89601 :INSTrument[:SElect] ? |
| Example | :INST SA |
| Notes | The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application. A list of the valid mode choices is returned with the INST:CAT? Query. |
| Preset | This is unaffected by a Preset but is set on a “Restore System Defaults->All” to: |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :INSTrument[:SElect] GSM provided for backwards compatibility. Mapped to EDGE GSM. |
| Backwards Compatibility SCPI | :INSTrument[:SElect] SANalyzer provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: INST:SEL SCPI LC This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode. |
| Backwards Compatibility SCPI | :INSTrument[:SElect] REceiver provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: :INST:SEL EMI :CONF FSC |

| | |
|-------------------------------------|--|
| | This results in the analyzer being placed in the EMI Receiver Mode, running the Frequency Scan measurement, in order to emulate the ESU Receiver Mode. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.13.00 |
| Example | :INST 'SA' |
| Notes | The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above. The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available. |
| Backwards Compatibility SCPI | :INSTrument[:SElect] `SA' 'PNOISE' 'EDGE' 'GSM' 'BASIC' |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The Mode name appears on the banner after the word “Keysight” followed by the Measurement Title. For example, for the IQ Analyzer mode with the Complex Spectrum measurement running:



It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (**System, Power On, Configure Applications**). It is also possible, using the same utility, to specify a subset of the available applications to load into memory at startup time, which can significantly decrease the startup time of the analyzer. During runtime, if an application that is not loaded into memory is selected (by either pressing that applications Mode key or sending that applications :INST:SEL command over SCPI), there will be a pause while the Application is loaded. During this pause a message box that says “Loading application, please wait...” is displayed.

Each application (Mode) that runs in the X-Series signal analyzers consumes virtual memory. The various applications consume varying amounts of virtual memory, and as more applications run, the memory consumption increases. Once an application is run, some of its memory remains allocated even when it is not running, and is not released until the analyzer program (xSA.exe) is shut down.

Keysight characterizes each Mode and assigns a memory usage quantity based on a conservative estimate. There is a limited amount of virtual memory available to applications (note that this is virtual memory and is independent of how much physical RAM is in the instrument). The instrument keeps track of how much memory is being used by all loaded applications – which includes those that preloaded at startup, and all of those that have been run since startup.

When you request a Mode that is not currently loaded, the instrument looks up the memory estimate for that Mode, and adds it to the residual total for all currently loaded Modes. If there is not enough virtual memory to load the Mode, a dialog box and menu will appear that gives you four options:

1. Close and restart the analyzer program without changing your configured preloads. This may free up enough memory to load the requested Mode, depending on your configured preloads
2. Clear out all preloads and close and restart the analyzer program with only the requested application preloaded, and with that application running. This choice is guaranteed to allow you to run the requested application; but you will lose your previously configured preloads. In addition, there may be little or no room for other applications, depending on the size of the requested application.
3. Bring up the Configure Applications utility in order to reconfigure the preloaded apps to make room for the applications you want to run (this will then require restarting the analyzer program with your new configuration). This is the recommended choice because it gives you full flexibility to select exactly what you want.
4. Exit the dialog box without doing anything, which means you will be unable to load the application you requested.

In each case except 4, this will cause the analyzer software to close, and you will lose all unsaved traces and results.

If you attempt to load a mode via SCPI that will exceed memory capacity, the Mode does not load and an error message is returned:

```
-225, "Out of memory;Insufficient resources to load Mode (mode name) "
```

where "mode name" is the SCPI parameter for the Mode in question, for example, SA for Spectrum Analyzer Mode.

Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|---------------------------------|
| Example | INST:SEL SEQAN INST:NSEL 400 |
| Initial S/W Revision | A.05.01 |

IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-------------------------------|
| Example | INST:SEL BASIC INST:NSEL 8 |
| Initial S/W Revision | Prior to A.02.00 |

W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-------------------------------|
| Example | INST:SEL WCDMA INST:NSEL 9 |
| Initial S/W Revision | Prior to A.02.00 |

GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|--------------------------|----------------------------------|
| Example | INST:SEL EDGEGSM INST:NSEL 13 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00 |

TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------|------------------|
| Example | INST:SEL TDSCDMA |

| | |
|----------------------|------------------|
| | INST:NSEL 211 |
| Initial S/W Revision | Prior to A.02.00 |

WLAN

Selects the WLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|--------------------------------|
| Example | INST:SEL WLAN INST:NSEL 217 |
| Initial S/W Revision | A.09.491 |

89601 VSA

Selecting the 89601 VSA mode will start the 89600 VSA software. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for R&D engineers. Even for proprietary and non-standard signals in SATCOM or MILCOM applications, you can make signal quality measurements with customized IQ constellation. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 35 general-purpose analog and digital demodulators ranging from 2FSK to 4096QAM
- Flexible and custom IQ and OFDM signal analysis for single carrier
- Standards specific modulation analysis including:
 - Cellular: GSM/EDGE, cdma2000, W-CDMA, TD-SCDMA, LTE(FDD/TDD),
 - LTE-Advanced and more
 - Wireless networking: 802.11a/b/g, 802.11n, 802.ac, 802.16 WiMAX (fixed/mobile), WiSUN (MR-FSK PHY)
 - RFID
 - Digital satellite video and other satellite signals, radar, LMDS
 - Up to 400K bin FFT, for the highest resolution spectrum analysis
 - A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
 - 20 simultaneous trace displays and the industry's most complete set of marker functions
 - Easy-to-use Microsoft Windows graphical user interface

For more information see the Keysight 89600 Series VSA web site at www.keysight.com/find/89600vsa

To learn more about how to use the 89600 VSA running in the X-Series, after the 89600 VSA software is running, open the 89600 VSA Help and open the "About Keysight X-Series Signal Analyzer with 89600 VSA Software" help topic.

| Key Path | Mode |
|----------------------|------------------------------------|
| Example | INST:SEL VSA89601 INST:NSEL 101 |
| Initial S/W Revision | Prior to A.02.00 |

LTE-Advanced FDD

As LTE-Advanced FDD and LTE modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE and LTE-Advanced FDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|-------------------------------------|--|
| Example | INST:SEL LTEAFDD INST:NSEL 107 |
| Notes | When the N9080A/80B-1FP exists, the display mode name is LTE. When the N9080A/80B-1FP and N9080B-2FP all exist, the display mode name is LTE FDD & LTE-A FDD. |
| Backwards Compatibility SCPI | INST:SEL LTE INST:NSEL 102 |
| Initial S/W Revision | A.14.00 |
| Modified at S/W Revision | A.14.50 |

LTE-Advanced TDD

As LTE-Advanced TDD and LTE TDD modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE TDD and LTE-Advanced TDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------|---|
| Example | INST:SEL LTEATDD INST:NSEL 108 |
| Notes | When the N9082A/82B-1FP exists, the display mode name is LTE TDD. When the N9082A/82B-1FP and N9082B-2FP all exist, the display mode name is LTE TDD & LTE-A |

| | |
|-------------------------------------|-----------------|
| | TDD. |
| Backwards Compatibility SCPI | INST:SEL LTETDD |
| | INST:NSEL 105 |
| Initial S/W Revision | A.14.00 |
| Modified at S/W Revision | A.14.50 |

Application Mode Number Selection (Remote Command Only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table in the same order they appear in the Mode menu (if the order is not changed by the Configure Applications utility found in the **System, Power On** menu). See "[Detailed List of Modes](#)" on page 214 for Mode details.

The Mode Number is the parameter for use with the :INSTRument:NSElect command. The Mode Parameter is the parameter for use with the :INSTRument[:SElect] command.

| Mode | Mode Number | Mode Parameter |
|---------------------------|-------------|----------------|
| Sequence Analyzer | 400 | SEQAN |
| I/Q Analyzer (Basic) | 8 | BASIC |
| WCDMA with HSPA+ | 9 | WCDMA |
| GSM/EDGE/EDGE Evo | 13 | EDGE GSM |
| Analog Demod | 234 | ADEMOD |
| Bluetooth | 228 | BTtooth |
| TD-SCDMA with HSPA/8PSK | 211 | TDSCDMA |
| cdma2000 | 10 | CDMA2K |
| 1xEV-DO | 15 | CDMA1XEV |
| LTE | 102 | LTE |
| LTE TDD | 105 | LTETDD |
| LTE-Advanced FDD | 107 | LTEAFDD |
| LTE-Advanced TDD | 108 | LTEATDD |
| WLAN | 217 | WLAN |
| 802.16 OFDM (Fixed WiMAX) | 104 | WIMAXFIXED |

| | |
|-----------------------|---|
| Remote Command | :INSTRument:NSElect <integer> :INSTRument:NSElect? |
| Example | :INST:NSEL 1 |
| Notes | SA mode is 1 |

| | |
|----------------------|---|
| | The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available. |
| Preset | Not affected by Preset. Set to default mode (1 for SA mode) following Restore System Defaults. |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

Application Mode Catalog Query (Remote Command Only)

Returns a string containing a comma separated list of names of all the installed and licensed measurement modes (applications). These names can only be used with the :INSTRument[:SElect] command.

| | |
|-------------------------------|---|
| Remote Command | :INSTRument:CATalog? |
| Example | :INST:CAT? |
| Notes | Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA" |
| Backwards Compatibility Notes | VSA (E4406A) :INSTRument:CATalog? returned a list of installed INSTRument:SElect items as a comma separated list of string values: "BASIC","GSM","EDGEgSM","CDMA","NADC","PDC","WCDMA","CDMA2K","CDMA1XEV","IDEN","WIDEN","WLAN","SERVICE" X-Series uses the ESA/PSA compatible query of a string contain comma separated values: "SA,PNOISE,NFIGURE,BASIC,CDMA,CDMA2K,WCDMA,CDMA1XEV,EDGEgSM,GSM,NADC,PDC,TDSCDMA,DMODULATION,WLAN" |
| Initial S/W Revision | Prior to A.02.00 |

Application Identification (Remote Commands Only)

Each entry in the Mode Menu will have a Model Number and associated information: Version, and Options.

This information is displayed in the Show System screen. The corresponding SCPI remote commands are defined here.

"Current Application Model " on page 211

"Current Application Revision" on page 212

"Current Application Options" on page 212

Current Application Model

Returns a string that is the Model Number of the currently selected application (mode).

| | |
|-----------------------|--|
| Remote Command | :SYSTem:APPLication[:CURRent] [:NAME]? |
|-----------------------|--|

| | |
|-----------------------------|--|
| Example | :SYST:APPL? |
| Notes | Query returns a quoted string that is the Model Number of the currently selected application (Mode). Example: "N9060A" String length is 6 characters. |
| Preset | Not affected by Preset |
| State Saved | Not saved in state, the value will be the selected application when a Save is done. |
| Initial S/W Revision | Prior to A.02.00 |

Current Application Revision

Returns a string that is the Revision of the currently selected application (mode).

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:APPLication[:CURRent]:REVisIon? |
| Example | :SYST:APPL:REV? |
| Notes | Query returns a quoted string that is the Revision of the currently selected application (Mode). Example: "1.0.0.0" String length is a maximum of 23 characters. (each numeral can be an integer + 3 decimal points) |
| Preset | Not affected by a Preset |
| State Saved | Not saved in state, the value will be the selected application when a Save is done. |
| Initial S/W Revision | Prior to A.02.00 |

Current Application Options

Returns a string that is the Options list of the currently selected application (Mode).

| | |
|-----------------------------|--|
| Remote Command | :SYSTem:APPLication[:CURRent]:OPTion? |
| Example | :SYST:APPL:OPT? |
| Notes | Query returns a quoted string that is the Option list of the currently selected application (Mode). The format is the name as the *OPT? or SYSTem:OPTion command: a comma separated list of option identifiers. Example: "1FP,2FP" String length is a maximum of 255 characters. |
| Preset | Not affected by a Preset |
| State Saved | Not saved in state per se, the value will be the selected application when a Save is invoked. |
| Initial S/W Revision | Prior to A.02.00 |

Application Identification Catalog (Remote Commands Only)

A catalog of the installed and licensed applications (Modes) can be queried for their identification.

"Application Catalog Number of Entries" on page 213

"Application Catalog Model Numbers" on page 213

"Application Catalog Revision" on page 213

"Application Catalog Options" on page 214

Application Catalog Number of Entries

Returns the number of installed and licensed applications (Modes).

| | |
|-----------------------|---|
| Remote Command | :SYSTem:APPLication:CATalog[:NAME]:COUNT? |
| Example | :SYST:APPL:CAT:COUN? |
| Preset | Not affected by Preset |
| State Saved | Not saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Application Catalog Model Numbers

Returns a list of Model Numbers for the installed and licensed applications (Modes).

| | |
|-----------------------|--|
| Remote Command | :SYSTem:APPLication:CATalog[:NAME]? |
| Example | :SYST:APPL:CAT? |
| Notes | Returned value is a quoted string of a comma separated list of Model Numbers. Example, if SAMS and Phase Noise are installed and licensed: "N9060A,N9068A" String length is COUNT * 7 - 1. (7 = Model Number length + 1 for comma. -1 = no comma for the 1st entry.) |
| Preset | Not affected by a Preset |
| State Saved | Not saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Application Catalog Revision

Returns the Revision of the provided Model Number.

| | |
|-----------------------|--|
| Remote Command | :SYSTem:APPLication:CATalog:REVision? <model> |
| Example | :SYST:APPL:CAT:REV? 'N9060A' |
| Notes | Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed: |

| | |
|----------------------|--------------------------------|
| | "1.0.0.0" |
| Preset | Not affected by a Preset. |
| State Saved | Not saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Application Catalog Options

Returns a list of Options for the provided Model Number

| | |
|-----------------------|---|
| Remote Command | :SYSTem:APPLication:CATalog:OPTion? <model> |
| Example | :SYST:APPL:CAT:OPT? 'N9060A' |
| Notes | Returned value is a quoted string of a comma separated list of Options, in the same format as *OPT? or :SYSTem:OPTion?. If the provided Model Number is not installed and licensed a null-string ("") will be returned. Example, if SAMS is installed and licensed: "2FP" String length is a maximum of 255 characters. |
| Preset | Not affected by a Preset |
| State Saved | Not saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Detailed List of Modes

This section contains an alphabetical list of Modes available in the X-Series, along with a brief description of each Mode.

89601 VSA

Selecting the 89601 VSA mode will start the 89600 VSA software. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for R&D engineers. Even for proprietary and non-standard signals in SATCOM or MILCOM applications, you can make signal quality measurements with customized IQ constellation. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 35 general-purpose analog and digital demodulators ranging from 2FSK to 4096QAM
- Flexible and custom IQ and OFDM signal analysis for single carrier
- Standards specific modulation analysis including:
 - Cellular: GSM/EDGE, cdma2000, W-CDMA, TD-SCDMA, LTE(FDD/TDD),
 - LTE-Advanced and more
 - Wireless networking: 802.11a/b/g, 802.11n, 802.ac, 802.16 WiMAX (fixed/mobile), WiSUN (MR-FSK PHY)

- RFID
- Digital satellite video and other satellite signals, radar, LMDS
- Up to 400K bin FFT, for the highest resolution spectrum analysis
- A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
- 20 simultaneous trace displays and the industry's most complete set of marker functions
- Easy-to-use Microsoft Windows graphical user interface

For more information see the Keysight 89600 Series VSA web site at www.keysight.com/find/89600vsa

To learn more about how to use the 89600 VSA running in the X-Series, after the 89600 VSA software is running, open the 89600 VSA Help and open the "About Keysight X-Series Signal Analyzer with 89600 VSA Software" help topic.

| Key Path | Mode |
|----------------------|------------------------------------|
| Example | INST:SEL VSA89601 INST:NSEL 101 |
| Initial S/W Revision | Prior to A.02.00 |

GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|--------------------------|----------------------------------|
| Example | INST:SEL EDGEGSM INST:NSEL 13 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00 |

IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-------------------------------|
| Example | INST:SEL BASIC INST:NSEL 8 |
| Initial S/W Revision | Prior to A.02.00 |

LTE

Selects the LTE mode for general purpose measurements of signals following the LTE FDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-------------------------------|
| Example | INST:SEL LTE INST:NSEL 102 |
| Initial S/W Revision | Prior to A.02.00 |

LTE TDD

Selects the LTE TDD mode for general purpose measurements of signals following the LTE TDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|----------------------------------|
| Example | INST:SEL LTETDD INST:NSEL 105 |
| Initial S/W Revision | A.03.00 |

LTE-Advanced FDD

As LTE-Advanced FDD and LTE modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE and LTE-Advanced FDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------|-----------------------------------|
| Example | INST:SEL LTEAFDD INST:NSEL 107 |

| | |
|-------------------------------------|--|
| Notes | When the N9080A/80B-1FP exists, the display mode name is LTE. When the N9080A/80B-1FP and N9080B-2FP all exist, the display mode name is LTE FDD & LTE-A FDD. |
| Backwards Compatibility SCPI | INST:SEL LTE INST:NSEL 102 |
| Initial S/W Revision | A.14.00 |
| Modified at S/W Revision | A.14.50 |

LTE-Advanced TDD

As LTE-Advanced TDD and LTE TDD modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE TDD and LTE-Advanced TDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|-------------------------------------|--|
| Example | INST:SEL LTEATDD INST:NSEL 108 |
| Notes | When the N9082A/82B-1FP exists, the display mode name is LTE TDD. When the N9082A/82B-1FP and N9082B-2FP all exist, the display mode name is LTE TDD & LTE-A TDD. |
| Backwards Compatibility SCPI | INST:SEL LTETDD INST:NSEL 105 |
| Initial S/W Revision | A.14.00 |
| Modified at S/W Revision | A.14.50 |

Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|---------------------------------|
| Example | INST:SEL SEQAN INST:NSEL 400 |
| Initial S/W Revision | A.05.01 |

TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-----------------------------------|
| Example | INST:SEL TDSCDMA INST:NSEL 211 |
| Initial S/W Revision | Prior to A.02.00 |

W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|-------------------------------|
| Example | INST:SEL WCDMA INST:NSEL 9 |
| Initial S/W Revision | Prior to A.02.00 |

WLAN

Selects the WLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

| Key Path | Mode |
|----------------------|--------------------------------|
| Example | INST:SEL WLAN INST:NSEL 217 |
| Initial S/W Revision | A.09.491 |

Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the “Global Center Frequency” switch to on, it applies to all Modes that support Global Settings.

| Key Path | Mode Setup |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Global Center Freq

The software maintains a Mode Global value called “Global Center Freq”.

When the **Global Center Freq** key is switched to **On** in any mode, the current mode’s center frequency is copied into the Global Center Frequency, and from then on all modes that support global settings use the Global Center Frequency. So you can switch between any of these modes and the Center Freq will remain unchanged.

Adjusting the Center Freq of any mode which supports Global Settings, while **Global Center Freq** is **On**, will modify the Global Center Frequency.

When **Global Center Freq** is turned **Off**, the Center Freq of the current mode is unchanged, but now the Center Freq of each mode is once again independent.

When **Mode Preset** is pressed while **Global Center Freq** is **On**, the Global Center Freq is preset to the preset Center Freq of the current mode.

This function is reset to Off when the Restore Defaults key is pressed in the Global Settings menu, or when **System, Restore Defaults, All Modes** is pressed.

| Key Path | Mode Setup, Global Settings |
|-----------------------|---|
| Scope | Mode Global |
| Remote Command | :INSTrument:COUPle:FREQuency:CENTer ALL NONE :INSTrument:COUPle:FREQuency:CENTer? |
| Example | INST:COUP:FREQ:CENT ALL INST:COUP:FREQ:CENT? |
| Preset | Set to Off on Global Settings, Restore Defaults and System, Restore Defaults, All Modes |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Remote Command | :GLOBal:FREQuency:CENTer[:STATe] 1 0 ON OFF :GLOBal:FREQuency:CENTer[:STATe]? |
| Preset | Off |
| Initial S/W Revision | Prior to A.02.00 |

Restore Defaults

This key resets all of the functions in the Global Settings menu to Off. This also occurs when **System, Restore Defaults, All Modes** is pressed.

| | |
|---------------------------------|------------------------------------|
| Key Path | Mode Setup, Global Settings |
| Remote Command | :INSTrument:COUPle:DEFault |
| Example | INST:COUP:DEF |
| Backwards Compatibility SCPI | :GLOBal:DEFault |
| Initial S/W Revision | Prior to A.02.00 |

Mode Setup

This key accesses a menu to allow you to select mode parameters. These settings apply to all measurements in the current mode.

| | |
|--------------------------|------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45501 |

Radio Std

Accesses the Radio Std menu. In this menu, 3 group of WLAN standards can be selected. The first is 802.11a/b/g/j/p which includes 802.11a/g/j/p, 802.11b/g, 802.11g DSSS-OFDM, 802.11j/p 10M, 802.11p 5M. The second is 802.11n which includes 802.11n 20MHz and 802.11n 40MHz. The third one is 802.11ac which includes 802.11ac 20MHz, 802.11ac 40MHz, 802.11ac 80MHz, 802.11ac 80+80MHz and 802.11ac 160MHz. The fourth is 802.11ah which includes 802.11ah1MHz, 802.11ah2MHz, 802.11ah4MHz, 802.11ah8MHz, and 802.11ah16MHz. Below each separate standard, the parameters related to demodulation can be set, such as modulation format, Guard Interval, and so forth.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup |
| Mode | WLAN |
| Scope | Meas Global |
| Remote Command | [:SENSe]:RADio:STANdard[:WLAN] AG BG GDO N20 N40 AC20 AC40 AC80 ACT80 AC160 AH1 AH2 AH4 AH8 AH16 JP10 P5 [:SENSe]:RADio:STANdard[:WLAN]? |
| Example | RAD:STAN AG RAD:STAN? |
| Notes | <p>1)If only N9077A-2FP/TP is installed, 802.11a/b/g/j/p key and its following radio standard keys will be available, other keys will be blanked. And SCPI command only support AG BG GDO JP10 P5.</p> <p>2)If N9077A-2FP/TP + N9077A-3FP/TP are installed, 802.11a/b/g, 802.11n and their following keys will be available. And SCPI command only support AG BG GDO N20 N40.</p> <p>3)If N9077A-2FP/TP + N9077A-3FP/TP + N9077A-4FP are installed, 802.11a/b/g, 802.11n, 802.11ac and their following keys will be available. And SCPI command only support AG BG GDO N20 N40 AC20 AC40 AC80 ACT80 AC160.</p> <p>4)If N9077A-6FP/TP are installed, 802.11ah key and its following radio standard keys will be available. And SCPI command will support AH1 AH2 AH4 AH8 AH16</p> <p>If the SCPI command is sent with unsupported parameters, an error is generated, -221.1900, "Settings conflict;option not installed"</p> <p>For IQ measurements (CCDF, Power vs Time, Spectral Flatness or IQ Waveform or Modulation Accuracy), they are also limited by infoBW license. when any radio standard is selected in a IQ measurement which maximum BW could</p> |

| | |
|----------------------|--|
| | not meet this radio standard request, the “Invalid result;Wider BW required” message occurs, and the masurent should return invalid data. Enum “ACT80” means “AC Two 80MHz” (802.11ac 80+80 MHz) |
| Preset | AG |
| State Saved | Saved in instrument state. |
| Range | 802.11a/g/j/p (OFDM 20M) 802.11b/g (DSSS/CCK/PBCC) 802.11g (DSSS-OFDM) 802.11n (20 MHz) 802.11n (40 MHz) 802.11ac (20 MHz) 802.11ac (40 MHz) 802.11ac (80 MHz) 802.11ac (80 + 80MHz) 802.11ac (160MHz) 802.11ah(1MHz) 802.11ah(2MHz) 802.11ah(4MHz) 802.11ah(8MHz) 802.11ah(16MHz) 802.11j/p (OFDM 10M) 802.11p (OFDM 5M) |
| Initial S/W Revision | A.10.01 |

802.11a/b/g/j/p

This key accesses a menu to allow you to select 802.11a/g(OFDM),802.11b/g(DSSS/CCK/PBCC),802.11g (DSSS-OFDM).

| | |
|--------------------------|------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std |
| Initial S/W Revision | A.10.01 |

802.11a/b/g/j/p

This key accesses a menu to allow you to select 802.11a/g(OFDM),802.11b/g(DSSS/CCK/PBCC),802.11g (DSSS-OFDM).

| | |
|--------------------------|------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std |
| Initial S/W Revision | A.10.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11a/g |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AG:FORMat AUTO BPSK QPSK QAM16 QAM64 [:SENSe] :DEMod [:WLAN] :AG:FORMat ? |

| | |
|----------------------|---|
| Example | DEM:AG:FORM:AG AUTO DEM:AG:FORM:AG? |
| Preset | AUTO |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM |
| Initial S/W Revision | A.10.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11a/g |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AG:SUBCarrier:SPACing <freq> [:SENSe] :DEMod [:WLAN] :AG:SUBCarrier:SPACing? |
| Example | DEM:AG:SUBC:SPAC 312.5 kHz DEM:AG:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25MHz |
| Initial S/W Revision | A.10.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11n standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11a/g |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AG:GINTervalR1B4 R1B8 OTHer [:SENSe] :DEMod [:WLAN] :AG:GINTerval? |

| | |
|----------------------|----------------------------------|
| Example | DEM:AG:GINT R1B4 DEM:AG:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 Other |
| Initial S/W Revision | A.10.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11a/g, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AG:GINTerval:LENGth <real> [:SENSe] :DEMod [:WLAN] :AG:GINTerval:LENGth? |
| Example | DEM:AG:GINT:LENG 0.25 DEM:AG:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.10.01 |

802.11b/g

When 802.11b/g key is not selected, pressing this key selects the 802.11b/g standard as WLAN standard. When 802.11b/g key is already selected, pressing this key accesses the demodulation setup for 802.11b/g.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g |
| Mode | WLAN |
| Example | :RAD:STAN BG |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.10.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11b/g |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :BG:FORMat DSSS1 DSSS2 CCK55 CCK11 PBCC55 PBCC11 PBCC22 PBCC33 [:SENSe] :DEMod [:WLAN] :BG:FORMat? |
| Example | DEM:BG:FORM AUTO DEM:BG:FORM? |
| Preset | AUTO |
| State Saved | Saved in instrument state. |
| Range | DSSS 1.0Mbps DSSS 2.0Mbps CCK 5.5Mbps CCK 11.0Mbps PBCC 5.5Mbps PBCC 11.0Mbps PBCC 22.0Mbps PBCC 33.0Mbps |
| Initial S/W Revision | A.10.01 |

802.11g DSSS-OFDM

When 802.11g DSSS-OFDM key is not selected, pressing this key selects the 802.11g DSSS-OFDM standard as WLAN standard. When 802.11g DSSS-OFDM key is already selected, pressing this key accesses the demodulation setup for 802.11g DSSS-OFDM standard.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g |
| Mode | WLAN |
| Example | :RAD:STAN GDO |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.10.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11g DSSS-OFDM |

| | |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :GDO:FORMat AUTO BPSK QPSK QAM16 QAM64 [:SENSe] :DEMod [:WLAN] :GDO:FORMat? |
| Example | DEM:GDO:FORM AUTO DEM:GDO:FORM? |
| Preset | AUTO |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM |
| Initial S/W Revision | A.10.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11g DSSS-OFDM |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :GDO:SUBCarrier:SPACing <freq> [:SENSe] :DEMod [:WLAN] :GDO:SUBCarrier:SPACing? |
| Example | DEM:GDO:SUBC:SPAC 312.5 kHz DEM:GDO:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.10.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11n standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g, 802.11g DSSS-OFDM |

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:GDO:GINTerval R1B4 R1B8 OTHer [:SENSe] :DEMod[:WLAN]:GDO:GINTerval? |
| Example | DEM:GDO:GINT R1B4 DEM:GDO:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 Other |
| Initial S/W Revision | A.10.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 a/b/g, 802.11 g DSSS-OFDM, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:GDO:GINTerval:LENGth <real> [:SENSe] :DEMod[:WLAN]:GDO:GINTerval:LENGth? |
| Example | DEM:GDO:GINT:LENG 0.25 DEM:GDO:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.10.01 |

802.11j/p 10 MHz

When 802.11j/p 10 MHz key is not selected, pressing this key selects the 802.11j/p 10 MHz standard as WLAN standard. When 802.11j/p 10 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11j/p 10 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 a/b/g/j/p |
| Mode | WLAN |
| Example | :RAD:STAN JP10 |

| | |
|----------------------|--|
| Notes | If N9077A-2FP/TP is not available installed, this key will be blanked. RAD:STAN JP10 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11j/p 10 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :JP10 :FORMat AUTO BPSK QPSK QAM16 QAM64 [:SENSe] :DEMod [:WLAN] :JP10 :FORMat ? |
| Example | DEM:JP10:FORM AUTO DEM:JP10:FORM ? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11j/p 10 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :JP10 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :JP10 :SUBCarrier :SPACing ? |
| Example | DEM:JP10:SUBC:SPAC 312.5 kHz DEM:JP10:SUBC:SPAC ? |
| Preset | 156.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |

| | |
|----------------------|----------|
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11j/p 10MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :JP10 :GINTerval R1B4 R1B8 OTHer [:SENSe] :DEMod [:WLAN] :JP10 :GINTerval ? |
| Example | DEM:JP10:GINT R1B4 DEM:JP10:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11a/b/g/j/p, 802.11j/p 10 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :JP10 :GINTerval :LENGth <real> [:SENSe] :DEMod [:WLAN] :JP10 :GINTerval :LENGth ? |
| Example | DEM:JP10:GINT:LENG 0.25 DEM:JP10:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11p 5MHz

When 802.11p 5MHz key is not selected, pressing this key selects the 802.11p 5MHz standard as WLAN standard. When 802.11p 5MHz key is already selected, pressing this key accesses the demodulation setup for 802.11p 5MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p |
| Mode | WLAN |
| Example | :RAD:STAN P5 |
| Notes | If N9077A-2FP is not available this key will be blanked. RAD:STAN P5 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11p 5MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :P5:FORMat AUTO BPSK QPSK QAM16 QAM64 [:SENSe] :DEMod [:WLAN] :P5:FORMat? |
| Example | DEM:P5:FORM AUTO DEM:P5:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|-----------------------|--|
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11p 5MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :P5 :SUBCarrier :SPACing <freq></code> <code>[:SENSe] :DEMod [:WLAN] :P5 :SUBCarrier :SPACing?</code> |
| Example | DEM:P5:SUBC:SPAC 78.125 kHz DEM:P5:SUBC:SPAC? |
| Preset | 78.125 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11a/b/g/j/p, 802.11p 5MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :P5 :GINterval R1B4 R1B8 OTher</code> <code>[:SENSe] :DEMod [:WLAN] :P5 :GINterval?</code> |
| Example | DEM:P5:GINT R1B4 DEM:P5:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11a/b/g/j/p, 802.11p 5 MHz, Guard Interval |

| | |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:P5:GINTerval:LENGth <real> [:SENSe] :DEMod[:WLAN]:P5:GINTerval:LENGth? |
| Example | DEM:P5:GINT:LENG 0.25 DEM:P5:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11n

This key accesses a menu to allow you to select 802.11n (20M),802.11n(40M).

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std |
| Notes | For E/M/PXA platform: If N9077A-2FP/TP + N9077A-3FP/TP are installed, this key will be available. If only N9077A-2FP/TP is installed,this key will be blanked For CXA platform: If W9077A-2FP + W9077A-3FP are installed,this key will be available. If only W9077A-2FP is installed, this key will be blanked |
| Initial S/W Revision | A.10.01 |

802.11n 20 MHz

When 802.11n 20 MHz key is not selected, pressing this key selects the 802.11n 20 MHz standard as WLAN standard. When 802.11n 20 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11n 20 MHz standard.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n |
| Mode | WLAN |
| Example | :RAD:STAN N20 |
| Notes | For E/M/PXA platform: If N9077A-2FP/TP + N9077A-3FP/TP are installed, this key will be available. If only N9077A-2FP/TP is installed,this key will be blanked and :RAD:STAN N20 will return -221," Settings conflict; Option not available". |

| | |
|----------------------|---|
| | For CXA platform: If W9077A-2FP + W9077A-3FP are installed, this key will be available. If only W9077A-2FP is installed, this key will be blanked and :RAD:STAN N20 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.10.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 20 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :N20 :FORMat AUTO BPSK QPSK QAM16 QAM64 SIG [:SENSe] :DEMod [:WLAN] :N20 :FORMat ? |
| Example | DEM:N20:FORM AUTO DEM:N20:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM From SIG Syms |
| Initial S/W Revision | A.10.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n standards.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 20 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :N20 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :N20 :SUBCarrier :SPACing ? |
| Example | DEM:N20:SUBC:SPAC 312.5 kHz DEM:N20:SUBC:SPAC? |

| | |
|----------------------|----------------------------|
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.10.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11n standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 20 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :N20 :GINTerval R1B4 R1B8 SIG Other</code> <code>[:SENSe] :DEMod [:WLAN] :N20 :GINTerval ?</code> |
| Example | DEM:N20:GINT R1B4 DEM:N20:GINT? |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.10.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 20 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :N20 :GINTerval :LENGth <real></code> <code>[:SENSe] :DEMod [:WLAN] :N20 :GINTerval :LENGth ?</code> |
| Example | DEM:N20:GINT:LENG 0.25 DEM:N20:GINT:LENG? |

| | |
|----------------------|----------------------------|
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.10.01 |

802.11n 40 MHz

When 802.11n 40 MHz key is not selected, pressing this key selects the 802.11n 40 MHz standard as WLAN standard. When 802.11n 40 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11n 40 MHz standard.

| | |
|----------------------------------|---|
| parameter_ table_ 23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 n |
| Mode | WLAN |
| Example | :RAD:STAN N40 |
| Notes | <p>For E/M/PXA platform:</p> <p>1)If only N9077A-2FP/TP is installed, this key will be blanked. RAD:STAN N40 will return -221," Settings conflict; Option not available".</p> <p>2)If N9077A-2FP/TP + N9077A-3FP/TP are installed, this key will be available.</p> <p>(a)If maxium infoBW is less than 40 MHz and If current measurement is one of CCDF,Power vs Time,Spectral Flatness or IQ Waveform or Modulation Accuracy, then 802.1n(40MHz) key under radio standard is pressed, error message "Invalid results;Wider BW required" will be shown in message area of this measurement.</p> <p>(b)If maxium infoBW is less than 40 MHz and If current radio standard is 802.11 n(40M) and the current measurent is one of Monitor Spectrum, Channel Power,Occupied BW, Specturm Emission Mask or Spurious Emission, then switching current measurement to one of CCDF,Power vs Time,Spectral Flatness or IQ Waveform or Modulation Accuracy, error message "Invalid results;Wider BW required" will be shown in message area of switched measurement.</p> <p>For CXA platform:</p> <p>1)If W9077A-2FP is installed, this key will be blanked. RAD:STAN N40 will return -221," Settings conflict; Option not available".</p> <p>2)If W9077A-2FP + W9077A-3FP are installed, this key will be available.</p> <p>a)If current measurement is one of CCDF,Power vs Time,Spectral Flatness or IQ Waveform or Modulation Accuracy, then 802.1n(40MHz) key under radio standard is pressed, error message "Invalid results;Wider BW required" will be shown in message area of this measurement.</p> <p>b)If current radio standard is 802.11 n(40M) and the current measurent is one of Monitor Spectrum, Channel Power,Occupied BW, Specturm Emission Mask or Spurious Emission, then switching current measurement to one of CCDF,Power vs Time,Spectral Flatness or IQ Waveform or Modulation Accuracy, error message "Invalid results;Wider BW required" will be shown in message area of switched measurement.</p> |
| State | Saved in instrument state. |

| | |
|----------------------|---------|
| Saved | |
| Initial S/W Revision | A.10.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 40 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :N40 :FORMat AUTO BPSK QPSK QAM16 QAM64 SIG</code> <code>[:SENSe] :DEMod [:WLAN] :N40 :FORMat?</code> |
| Example | DEM:N40:FORM AUTO DEM:N40:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM From SIG Syms |
| Initial S/W Revision | A.10.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 40 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :N40 :SUBCarrier:SPACing <freq></code> <code>[:SENSe] :DEMod [:WLAN] :N40 :SUBCarrier:SPACing?</code> |
| Example | DEM:N40:SUBC:SPAC 312.5 kHz DEM:N40:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |

| | |
|----------------------|----------|
| Max | 1.25 MHz |
| Initial S/W Revision | A.10.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11n standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 40 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:N40:GINTerval R1B4 R1B8 SGI OTHer [:SENSe] :DEMod[:WLAN]:N40:GINTerval? |
| Example | DEM:N40:GINT R1B4 DEM:N40:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.10.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11n 40 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:N40:GINTerval:LENGth <real> [:SENSe] :DEMod[:WLAN]:N40:GINTerval:LENGth? |
| Example | DEM:N40:GINT:LENG 0.25 DEM:N40:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |

| | |
|----------------------|-----------|
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.10.01 |

802.11ac

This key accesses a menu to allow you to select 802.11ac (20MHz), 802.11ac (40MHz), 802.11ac (80MHz), 802.11ac (80+80MHz) and 802.11ac (160MHz)

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std |
| Notes | If N9077A-2FP/TP + N9077A-3FP/TP + N9077A-4FP/TP are installed, this key will be available. Otherwise this key will be blank |
| Initial S/W Revision | A.11.01 |

802.11ac 20 MHz

When 802.11ac 20 MHz key is not selected, pressing this key selects the 802.11ac 20 MHz standard as WLAN standard. When 802.11ac 20 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ac20 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac |
| Mode | WLAN |
| Example | :RAD:STAN AC20 |
| Notes | If N9077A-2FP/TP + N9077A-3FP/TP + N9077A-4FP/TP are installed, this key will be available. Otherwise this key will be blanked and :RAD:STAN AC20 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.11.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|----------------------|---|
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 20 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC20:FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 QAM1024 SIG</code> <code>[:SENSe] :DEMod [:WLAN] :AC20:FORMat?</code> |
| Example | DEM:AC20:FORM AUTO DEM:AC20:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM 1024QAM From SIG Syms |
| Initial S/W Revision | A.11.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n/ac standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 20 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC20:SUBCarrier:SPACing <freq></code> <code>[:SENSe] :DEMod [:WLAN] :AC20:SUBCarrier:SPACing?</code> |
| Example | DEM:AC20:SUBC:SPAC 312.5 kHz DEM:AC20:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11n, 802.11n 20 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC20:GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod [:WLAN] :AC20:GINTerval? |
| Example | DEM:AC20:GINT R1B4 DEM:AC20:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 160 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC160:GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod [:WLAN] :AC160:GINTerval? |
| Example | DEM:AC160:GINT R1B4 DEM:AC160:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac20 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC20:GINTerval:LENGth <real> [:SENSe] :DEMod [:WLAN] :AC20:GINTerval:LENGth? |
| Example | DEM:AC20:GINT:LENG 0.25 DEM:AC20:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.11.01 |

802.11ac 40 MHz

When 802.11ac 40 MHz key is not selected, pressing this key selects the 802.11ac 40 MHz standard as WLAN standard. When 802.11ac 40 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ac 40 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac |
| Mode | WLAN |
| Example | :RAD:STAN AC40 |
| Notes | If N9077A-4FP/TP is not available installed, this key will be blanked. RAD:STAN AC40 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.11.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 40 MHz |
| Mode | WLAN |

| | |
|-----------------------------|--|
| Remote Command | [:SENSe]:DEMod[:WLAN]:AC40:FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 QAM1024 SIG [:SENSe]:DEMod[:WLAN]:AC40:FORMat? |
| Example | DEM:AC40:FORM AUTO DEM:AC40:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM 1024QAM From SIG Syms |
| Initial S/W Revision | A.11.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n/ac standards.

| | |
|-----------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 40 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe]:DEMod[:WLAN]:AC40:SUBCarrier:SPACing <freq> [:SENSe]:DEMod[:WLAN]:AC40:SUBCarrier:SPACing? |
| Example | DEM:AC40:SUBC:SPAC 312.5 kHz DEM:AC40:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 40 MHz |

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC40:GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod [:WLAN] :AC40:GINTerval? |
| Example | DEM:AC40:GINT R1B4 DEM:AC40:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ac 40 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC40:GINTerval:LENGth <real> [:SENSe] :DEMod [:WLAN] :AC40:GINTerval:LENGth? |
| Example | DEM:AC40:GINT:LENG 0.25 DEM:AC40:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.11.01 |

802.11ac 80 MHz

When 802.11ac 80 MHz key is not selected, pressing this key selects the 802.11ac 80 MHz standard as WLAN standard. When 802.11ac 80 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ac 80 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac |
| Mode | WLAN |
| Example | :RAD:STAN AC80 |

| | |
|----------------------|--|
| Notes | If N9077A-4FP is not available this key will be blanked. RAD:STAN AC80 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.11.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ac, 802.11 ac 80 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC80 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 QAM1024 SIG [:SENSe] :DEMod [:WLAN] :AC80 :FORMat ? |
| Example | DEM:AC80:FORM AUTO DEM:AC80:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM 1024QAM From SIG Syms |
| Initial S/W Revision | A.11.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11 a/g/n/ac standards.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ac, 802.11 ac 80 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AC80 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :AC80 :SUBCarrier :SPACing ? |
| Example | DEM:AC80:SUBC:SPAC 312.5 kHz DEM:AC80:SUBC:SPAC? |
| Preset | 312.5 kHz |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 80 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC80 :GINTerval R1B4 R1B8 SIG Other</code> <code>[:SENSe] :DEMod [:WLAN] :AC80 :GINTerval ?</code> |
| Example | DEM:AC80:GINT R1B4 DEM:AC80:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ac 80 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC80 :GINTerval :LENGth <real></code> <code>[:SENSe] :DEMod [:WLAN] :AC80 :GINTerval :LENGth ?</code> |
| Example | DEM:AC80:GINT:LENG 0.25 DEM:AC80:GINT:LENG? |

| | |
|----------------------|----------------------------|
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.11.01 |

802.11ac 80+80 MHz

When 802.11ac 80+80 MHz key is not selected, pressing this key selects the 802.11ac 80+80 MHz standard as WLAN standard. When 802.11ac 80+80 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ac 80+80 MHz standard.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ac |
| Mode | WLAN |
| Example | :RAD:STAN ACT80 |
| Notes | If N9077A-4FP is not available this key will be blanked. RAD:STAN ACT80 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.11.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ac, 802.11 ac 80 +80 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :ACT80 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 QAM1024 SIG [:SENSe] :DEMod [:WLAN] :ACT80 :FORMat? |
| Example | DEM:ACT80:FORM AUTO DEM:ACT80:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM 1024QAM From SIG Syms |
| Initial S/W Revision | A.11.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n/ac standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 80 +80 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :ACT80 :SUBCarrier :SPACing <freq></code> <code>[:SENSe] :DEMod [:WLAN] :ACT80 :SUBCarrier :SPACing?</code> |
| Example | DEM:ACT80:SUBC:SPAC 312.5 kHz DEM:ACT80:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 80 + 80 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :ACT80 :GINTerval R1B4 R1B8 SIG OTHER</code> <code>[:SENSe] :DEMod [:WLAN] :ACT80 :GINTerval?</code> |
| Example | DEM:ACT80:GINT R1B4 DEM:ACT80:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ac 80 + 80 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :ACT80 :GINTerval :LENGth <real> [:SENSe] :DEMod [:WLAN] :ACT80 :GINTerval :LENGth? |
| Example | DEM:ACT80:GINT:LENG 0.25 DEM:ACT80:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.11.01 |

802.11ac 160 MHz

When 802.11ac 160 MHz key is not selected, pressing this key selects the 802.11ac 160 MHz standard as WLAN standard. When 802.11ac 160 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ac 160 MHz standard.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac |
| Mode | WLAN |
| Example | :RAD:STAN AC160 |
| Notes | If N9077A-4FP is not available this key will be blanked. RAD:STAN AC160 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.11.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 160 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC160 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 QAM1024 SIG</code> <code>[:SENSe] :DEMod [:WLAN] :AC160 :FORMat ?</code> |
| Example | DEM:AC160:FORM AUTO DEM:AC160:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM 1024QAM From SIG Syms |
| Initial S/W Revision | A.11.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 312.5 kHz matches the 802.11a/g/n/ac standards.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ac, 802.11ac 160 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AC160 :SUBCarrier :SPACing <freq></code> <code>[:SENSe] :DEMod [:WLAN] :AC160 :SUBCarrier :SPACing ?</code> |
| Example | DEM:AC160:SUBC:SPAC 312.5 kHz DEM:AC160:SUBC:SPAC? |
| Preset | 312.5 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.11.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th. The 802.11a/g standards

require that the guard interval always is 1/4 of the FFT length. The 802.11ac standard allows values of either 1/4 or you can select from HT-SIG.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ac, 802.11 ac 160 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:AC160:GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod[:WLAN]:AC160:GINTerval? |
| Example | DEM:AC160:GINT R1B4 DEM:AC160:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.11.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11 ac 160 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:AC160:GINTerval:LENGth <real> [:SENSe] :DEMod[:WLAN]:AC160:GINTerval:LENGth? |
| Example | DEM:AC160:GINT:LENG 0.25 DEM:AC160:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.11.01 |

802.11ah

This key accesses a menu to allow you to select 802.11ah (1MHz), 802.11ah (2MHz), 802.11ah (4MHz), 802.11ah (8MHz) and 802.11ah (16MHz)

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|----------------------|---|
| Key Path | Mode Setup, Radio std |
| Notes | If N9077A-6FP/TP is installed, this key will be available. Otherwise this key will be blank |
| Initial S/W Revision | A.16.01 |

802.11ah 1 MHz

When 802.11ah 1 MHz key is not selected, pressing this key selects the 802.11ah 1 MHz standard as WLAN standard. When 802.11ah 1 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ah 1 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ah |
| Mode | WLAN |
| Example | :RAD:STAN AH1 |
| Notes | If N9077A-6FP/TP is installed, this key will be available. Otherwise this key will be blanked and :RAD:STAN AH1 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ah, 802.11 ah 1 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH1 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 SIG [:SENSe] :DEMod [:WLAN] :AH1 :FORMat? |
| Example | DEM:AH1:FORM AUTO DEM:AH1:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM From SIG Syms |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 31.25 kHz matches the 802.11ah standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah1 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe]:DEMod[:WLAN]:AH1:SUBCarrier:SPACing <freq> [:SENSe]:DEMod[:WLAN]:AH1:SUBCarrier:SPACing? |
| Example | DEM:AH1:SUBC:SPAC 31.25 kHz DEM:AH1:SUBC:SPAC? |
| Preset | 31.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 1 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe]:DEMod[:WLAN]:AH1:GINTerval R1B4 R1B8 SIG OTHer [:SENSe]:DEMod[:WLAN]:AH1:GINTerval? |
| Example | DEM:AH1:GINT R1B4 DEM:AH1:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah1 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH1 :GINTerval :LENGth <real> [:SENSe] :DEMod [:WLAN] :AH1 :GINTerval :LENGth? |
| Example | DEM:AH1:GINT:LENG 0.25 DEM:AH1:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11ah 2 MHz

When 802.11ah 2 MHz key is not selected, pressing this key selects the 802.11ah 2 MHz standard as WLAN standard. When 802.11ah 2 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ah 2 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah |
| Mode | WLAN |
| Example | :RAD:STAN AH2 |
| Notes | If N9077A-6FP/TP is not available installed, this key will be blanked. RAD:STAN AC40 will return -221," Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|-----------------------------|--|
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 2 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH2 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 SIG [:SENSe] :DEMod [:WLAN] :AH2 :FORMat ? |
| Example | DEM:AH2:FORM AUTO DEM:AH2:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM From SIG Syms |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 31.25 kHz matches the 802.11ah standards.

| | |
|-----------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 2 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH2 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :AH2 :SUBCarrier :SPACing ? |
| Example | DEM:AH2:SUBC:SPAC 31.25 kHz DEM:AH2:SUBC:SPAC? |
| Preset | 31.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|-----------------------|---|
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 2 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH2 :GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod [:WLAN] :AH2 :GINTerval? |
| Example | DEM:AH2:GINT R1B4 DEM:AH2:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ah 2 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH2 :GINTerval :LENGth <real> [:SENSe] :DEMod [:WLAN] :AH2 :GINTerval :LENGth? |
| Example | DEM:AH2:GINT:LENG 0.25 DEM:AH2:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11ah 4 MHz

When 802.11ah 4 MHz key is not selected, pressing this key selects the 802.11ah 4 MHz standard as WLAN standard. When 802.11ah 4 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ah 4 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah |

| | |
|----------------------|---|
| Mode | WLAN |
| Example | :RAD:STAN AH4 |
| Notes | If N9077A-6FP is not available this key will be blanked. RAD:STAN AH4 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 4 MHz |
| Mode | WLAN |
| Remote Command | [:SENSE] :DEMod [:WLAN] :AH4 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 SIG [:SENSe] :DEMod [:WLAN] :AH4 :FORMat? |
| Example | DEM:AH4:FORM AUTO DEM:AH4:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM From SIG Syms |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 31.25 kHz matches the 802.11ah standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 4 MHz |
| Mode | WLAN |
| Remote Command | [:SENSE] :DEMod [:WLAN] :AH4 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :AH4 :SUBCarrier :SPACing? |
| Example | DEM:AH4:SUBC:SPAC 312.5 kHz |

| | |
|----------------------|----------------------------|
| | DEM:AH4:SUBC:SPAC? |
| Preset | 31.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ah, 802.11 ah 4 MHz |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AH4 :GINTerval R1B4 R1B8 SIG Other</code> <code>[:SENSe] :DEMod [:WLAN] :AH4 :GINTerval?</code> |
| Example | DEM:AH4:GINT R1B4 DEM:AH4:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11 ah 4 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :DEMod [:WLAN] :AH4 :GINTerval :LENGth <real></code> <code>[:SENSe] :DEMod [:WLAN] :AH4 :GINTerval :LENGth?</code> |
| Example | DEM:AH4:GINT:LENG 0.25 DEM:AH4:GINT:LENG? |

| | |
|----------------------|----------------------------|
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11ah 8 MHz

When 802.11ah 8 MHz key is not selected, pressing this key selects the 802.11ah 8 MHz standard as WLAN standard. When 802.11ah 8 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ah 8 MHz standard.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah |
| Mode | WLAN |
| Example | :RAD:STAN AH8 |
| Notes | If N9077A-6FP is not available this key will be blanked. RAD:STAN AH8 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 8 MHz |
| Mode | WLAN |
| Remote Command | [:SENSE] :DEMod [:WLAN] :AH8 :FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 SIG [:SENSe] :DEMod [:WLAN] :AH8 :FORMat? |
| Example | DEM:AH8:FORM AUTO DEM:AH8:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM From SIG Syms |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 31.25 kHz matches the 802.11a/g/n/ac standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ah, 802.11 ah 8 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH8 :SUBCarrier :SPACing <freq> [:SENSe] :DEMod [:WLAN] :AH8 :SUBCarrier :SPACing? |
| Example | DEM:AH8:SUBC:SPAC 312.5 kHz DEM:AH8:SUBC:SPAC? |
| Preset | 31.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11 ah, 802.11 ah 8 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH8 :GINTerval R1B4 R1B8 SIG OTHER [:SENSe] :DEMod [:WLAN] :AH8 :GINTerval? |
| Example | DEM:AH8:GINT R1B4 DEM:AH8:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ah 8 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSE] :DEMod [:WLAN] :AH8 :GINTerval :LENGth <real> [:SENSE] :DEMod [:WLAN] :AH8 :GINTerval :LENGth? |
| Example | DEM:AH8:GINT:LENG 0.25 DEM:AH8:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

802.11ah 16 MHz

When 802.11ah 16 MHz key is not selected, pressing this key selects the 802.11ah 16 MHz standard as WLAN standard. When 802.11ah 16 MHz key is already selected, pressing this key accesses the demodulation setup for 802.11ah 16 MHz standard.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah |
| Mode | WLAN |
| Example | :RAD:STAN AH16 |
| Notes | If N9077A-6FP is not available this key will be blanked. RAD:STAN AH16 will return -221, "Settings conflict; Option not available". |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.16.01 |

Modulation Format

Accessing the modulation format key allows you to specify the modulation format of input signal. You can select Auto Detect to automatically detect the modulation format or specify modulation format for your testing.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|----------------------|---|
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 16 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:AH16:FORMat AUTO BPSK QPSK QAM16 QAM64 QAM256 SIG [:SENSe] :DEMod[:WLAN]:AH16:FORMat? |
| Example | DEM:AH16:FORM AUTO DEM:AH16:FORM? |
| Preset | Auto Detect |
| State Saved | Saved in instrument state. |
| Range | Auto Detect BPSK QPSK 16QAM 64QAM 256QAM From SIG Syms |
| Initial S/W Revision | A.16.01 |

Subcarrier Spacing

This parameter specifies the subcarrier frequency spacing of the input signal. This parameter must match the actual subcarrier frequency spacing of the input signal, otherwise demodulation will fail. The default 31.25 kHz matches the 802.11ah standards.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 16 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod[:WLAN]:AH16:SUBCarrier:SPACing <freq> [:SENSe] :DEMod[:WLAN]:AH16:SUBCarrier:SPACing? |
| Example | DEM:AH16:SUBC:SPAC 31.25 kHz DEM:AH16:SUBC:SPAC? |
| Preset | 31.25 kHz |
| State Saved | Saved in instrument state. |
| Min | 1Hz |
| Max | 1.25 MHz |
| Initial S/W Revision | A.16.01 |

Guard Interval

This specifies the guard interval (also called cyclic extension) length for each symbol time, as a fraction of the FFT length. The value must match the guard interval length actually used in the input signal in order for demodulation to work properly. The value should be between zero and one, and values outside that range are clipped to be within the range. The value is rounded to the nearest 1/128th.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|-----------------------------|---|
| Key Path | Mode Setup, Radio std, 802.11ah, 802.11ah 16 MHz |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH16:GINTerval R1B4 R1B8 SIG OTHer [:SENSe] :DEMod [:WLAN] :AH16:GINTerval? |
| Example | DEM:AH16:GINT R1B4 DEM:AH16:GINT? |
| Notes | . |
| Preset | 1/4 |
| State Saved | Saved in instrument state. |
| Range | 1/4 1/8 From SIG Syms Other |
| Initial S/W Revision | A.16.01 |

Other

This specifies the guard interval (also called cyclic extension) length for each symbol time, when Guard Interval is set to Other, this value will be used as Guard Interval

| | |
|-----------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, 802.11ah 16 MHz, Guard Interval |
| Mode | WLAN |
| Remote Command | [:SENSe] :DEMod [:WLAN] :AH16:GINTerval:LENGth <real> [:SENSe] :DEMod [:WLAN] :AH16:GINTerval:LENGth? |
| Example | DEM:AH16:GINT:LENG 0.25 DEM:AH16:GINT:LENG? |
| Preset | 0.25 |
| State Saved | Saved in instrument state. |
| Min | 0.0078125 |
| Max | 1 |
| Initial S/W Revision | A.16.01 |

Restore Mode Defaults

Resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by the Restore System Defaults function. This function does reset mode data; as well as settings.

| | |
|-----------------|-------------------|
| Key Path | Mode Setup |
|-----------------|-------------------|

| | |
|-----------------------------|---|
| Remote Command | :INSTRument:DEFault |
| Example | :INST:DEF |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. A message comes up saying: "If you are sure, press key again". |
| Couplings | A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set. |
| Initial S/W Revision | Prior to A.02.00 |

Preset Type (Remote Command Only)

As stated in the Backward Compatibility section, to be compatible with ESA/PSA the PRESet:TYPE command will be implemented as a no-op.

| | |
|-----------------------------|--|
| Mode | All |
| Remote Command | :SYSTem:PRESet:TYPE FACTory MODE USER :SYSTem:PRESet:TYPE? |
| Example | :SYST:PRES:TYPE FACT |
| Notes | This command is supported for backward compatibility only. It is a no-op which does not change the behavior of any preset operation. |
| Preset | This is unaffected by Preset but is set to Mode on a "Restore System Defaults->All" |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the "Global Center Frequency" switch to on, it applies to all Modes that support Global Settings.

| | |
|-----------------------------|-------------------|
| Key Path | Mode Setup |
| Initial S/W Revision | Prior to A.02.00 |

Remote Analyzer Config

This key accesses a menu to allow you to select 802.11a/g(OFDM),802.11b/g(DSSS/CCK/PBCC),802.11g(DSSS-OFDM).

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45566 |

Select Highlighted Analyzer

You can navigate up and down in the list with the up and down arrow keys, and can select any entry by pressing the “Select Highlighted Analyzer” key.

Each time when pressing this softkey, the local analyzer will take the following actions:

1. Sets the current analyzer to the highlighted analyzer.
2. Checks the prerequisites of the highlighted analyzer (firmware version, options, etc.)
3. Switch the current Application in the selected remote analyzer to be the remote Application.
4. Lock the front panel of the selected remote analyzer.

| | |
|----------------------------------|---|
| parameter_ table_ 23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Remote Command | :SYSTem:COMMunicate:ANALyzer:SElect[:IPAddress] <address string> :SYSTem:COMMunicate:ANALyzer:SElect[:IPAddress]? |
| Example | :SYST:COMM:ANAL:SEL “146.208.172.102:5025” :SYST:COMM:ANAL:SEL? |
| Notes | <p>The parameter of the SCPI command is the IP address and SCPI socket port number of the analyzer in the remote analyzer list. If command drops SCPI socket number, then default SCPI port number is taken.</p> <p>In the “Analyzer Config” view, if an analyzer is selected successfully, then related “Selected” state will be “Yes”, or otherwise its state is “No”. System will automatically choose one available channel number for new selected remote analyzer, which is displayed in “Ch” grid view.</p> <p>If the parameter in an invalid IP address, for example an IP address with a wrong format or not in the remote analyzer list, an error message will be generated, for example, “0.0.0.0 is not a valid IP address.”.</p> <p>If the local analyzer fails to select the highlighted analyzer, an error message, which is “0.0.0.0 cannot be selected.”, will be shown in the message area.</p> <p>If the highlighted analyzer is already selected, an error message will be generated, for example, “0.0.0.0 is already selected”.</p> <p>If an analyzer is selected successfully, “:SYSTem:COMMunicate:ANALyzer:IPAddress?” will return the IP address of the selected analyzer in the remote analyzer list. Otherwise, it will return an empty string.</p> <p>Multiple remote analyzer selection is allowed, thus to support high order MIMO test. If there is already one selected analyzer, When a new remote one is selected, system will automatically assign next available channel number to it.</p> |
| Presets | The current analyzer selection is unaffected by a Mode Preset. |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45568 |

Delete Highlighted Analyzer

Deletes the highlighted analyzer from the remote analyzer list. You will be prompted with a dialog box to make sure you REALLY want to do this. The prompt says “The highlighted analyzer will be permanently deleted from the list. Are you sure you want to do this? Press Enter to proceed, or Cancel (ESC) to cancel.”

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Remote Command | :SYSTem:COMMunicate:ANALyzer:DELeTe[:IPAdDress] <address string> |
| Example | :SYST:COMM:ANAL:DEL “146.208.172.102:5025” |
| Notes | <p>The parameter of this SCPI command is the IP address and SCPI socket port number of the analyzer in the remote analyzer list which the user wants to delete.</p> <p>If the parameter is not a valid IP address and SCPI socket port number, for example, the IP address with a wrong format or not in the list of the remote analyzers, only the valid IP address will be accepted and an error message will be generated, for example, “Invalid IP address and SCPI socket port: 0.0.0.0:0000.”.</p> <p>If the user tries to delete a selected analyzer, the local analyzer will first tries to release the selected analyzer and then remove it from the list of the remote analyzers. If there is some errors during releasing the selected analyzer, an error message will be generated, for example, “Cannot release 0.0.0.0:0000.”. However, this analyzer will still be removed from the remote analyzer list.</p> |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45569 |

Delete All Analyzers

Deletes all analyzers in the remote analyzer list. You will be prompted with a dialog box to make sure you REALLY want to do this. The prompt says “All analyzers will be permanently deleted. Are you sure you want to do this? Press Enter to proceed, or Cancel (ESC) to cancel.”

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Remote | :SYSTem:COMMunicate:ANALyzer:DELeTe:ALL |

| | |
|-----------------------------|---|
| Command | |
| Example | :SYST:COMM:ANAL:DEL:ALL |
| Notes | If there is a selected analyzer, the local analyzer will first tries to release the selected analyzer and then remove it from the list of the remote analyzers. If there is some errors during releasing the selected analyzer, an error message will be generated, for example, "Cannot release 0.0.0.0.0000". However, this analyzer will still be removed from the remote analyzer list. |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45570 |

Add Analyzer To List

This menu allows you to add a new remote analyzer to the remote analyzer list.

The "Add Analyzer To List" softkey will be grayed out if the count of the remote analyzer list has reached 10.

| | |
|-----------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45571 |

IP Address

Lets you enter a new IP address of the remote analyzer. After you enter the address you should press "Add" to add the analyzer at that address to the Available Analyzer List.

| | |
|-----------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config, Add Analyzer to List |
| Preset | 0.0.0.0 |
| State Saved | No |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45572 |

SCPI Socket Port Number

Let you enter a new SCPI socket port number of the remote analyzer. After you enter the number you should press "Add" to add the analyzer at that address to the Available Analyzer List.

| | |
|--------------------------|-----------------|
| parameter_table_23.52557 | 52.93253 |
|--------------------------|-----------------|

| | |
|----------------------|--|
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config, Add Analyzer to List |
| Preset | 5025 |
| State Saved | No |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45573 |

Add

Adds the new analyzer to the remote analyzer list. When pressing this softkey, the following items will be checked:

1. Whether it is a new one to the remote analyzer list.
2. Whether the IP address is valid.
3. Whether the SCPI socket port number is valid.
4. Whether the IP address is the local IP address or not.
5. Whether the IP address has been added or not.
6. Whether the IP address can be visited by TCP/IP.

If the items are OK, the new remote analyzer will be inserted at the end of the remote analyzer list.

The “Add” softkey will be grayed out if the count of the list of the remote analyzers has reached 10.

| | |
|----------------------------|--|
| parameter_ table_ 23.52557 | 52.93253 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config, Add Analyzer to List |
| Remote Command | SYSTem:COMMunicate:ANALyzer:ADD[:IPAdDress] <address string> |
| Example | SYST:COMM:ANAL:ADD “146.208.172.102:5025” |
| Notes | If no supported analyzer is found at the specified address, an error message will be generated, for example, “Invalid IP address and SCPI socket port 0.0.0.0:0000”. The maximum number of analyzer is 10. If the user tries to add a new analyzer after the maximum number is reached, an error message will be generated, for example, “Maximum number of analyzer is reached.” |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45574 |

Verify Highlighted Connection

This key verifies the LAN interface connection to the Current Analyzer (It does NOT verify any signal connections.)

Each time after a new remote analyzer is inserted into the remote analyzer list, its state is “Unverified”.

When you press this key, the connection to the current analyzer will be verified. If the analyzer can be verified successfully, its “Verified” state will become “Yes”, otherwise its state will be “No”.

Verification includes the following items:

1. Whether the remote analyzer with the IP address can be visited by TCPIP.
2. Whether XA is started in the remote analyzer.
3. Whether the firmware of the remote analyzer is A.13.00 or a newer one.
4. Whether the remote analyzer has B40 option or not.
5. Whether the HW of the remote analyzer can support MIMO or not.
6. Whether the remote Application in the remote analyzer is available.

| | |
|-----------------------|---|
| parameter_ | 52.93253 |
| table_ | 23.52557 |
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Remote Command | :SYSTem:COMMunicate:ANALyzer:VERify <address string> |
| Example | :SYST:COMM:ANAL:VER "146.208.172.102:5025" |
| Notes | <p>The parameter of the SCPI command is the IP address and SCPI socket port number of the analyzer in the remote analyzer list.</p> <p>If the parameter in an invalid IP address and SCPI socket port, for example an IP address with a wrong format or not in the list of the remote analyzers, an error message will be generated, for example, “Invalid IP address and SCPI socket port 0.0.0.0:0000”.</p> <p>Use the command “SYSTem:COMMunicate:ANALyzer:INformation?” to obtain the result of the verification.</p> |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45575 |

Release Current Analyzer

Releases the current remote analyzer.

When the user presses this softkey, the front panel of the current selected analyzer will be unlocked.

When exiting the WLAN Application, if the user hasn’t released the current selected analyzer manually, it will be released automatically.

| | |
|------------|-----------------|
| parameter_ | 52.93253 |
| table_ | 23.52557 |

| | |
|----------------------|--|
| Key Path | Mode Setup, Global Settings, Remote Analyzer Config |
| Remote Command | SYSTem:COMMunicate:ANALyzer:RELease |
| Example | SYST:COMM:ANAL:REL |
| Notes | <p>In the “Analyzer Config” view, if the current selected analyzer is released successfully, its “Channel Index” will be set to be -1.</p> <p>If the local analyzer fails to release the current analyzer, a warning message, which is “0.0.0.0:0000 cannot be released.”, will be shown in the message area. However, its “Channel Index” will also be set to be -1.</p> <p>If there is no selected analyzer, no action will be taken and an error message will be generated, for example, “There is no selected analyzer.”</p> |
| Initial S/W Revision | A.14.00 |
| Help Map ID | 45576 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

6 System Functions

File

Opens a menu that enables you to access various standard and custom Windows functions. Press any other front-panel key to exit

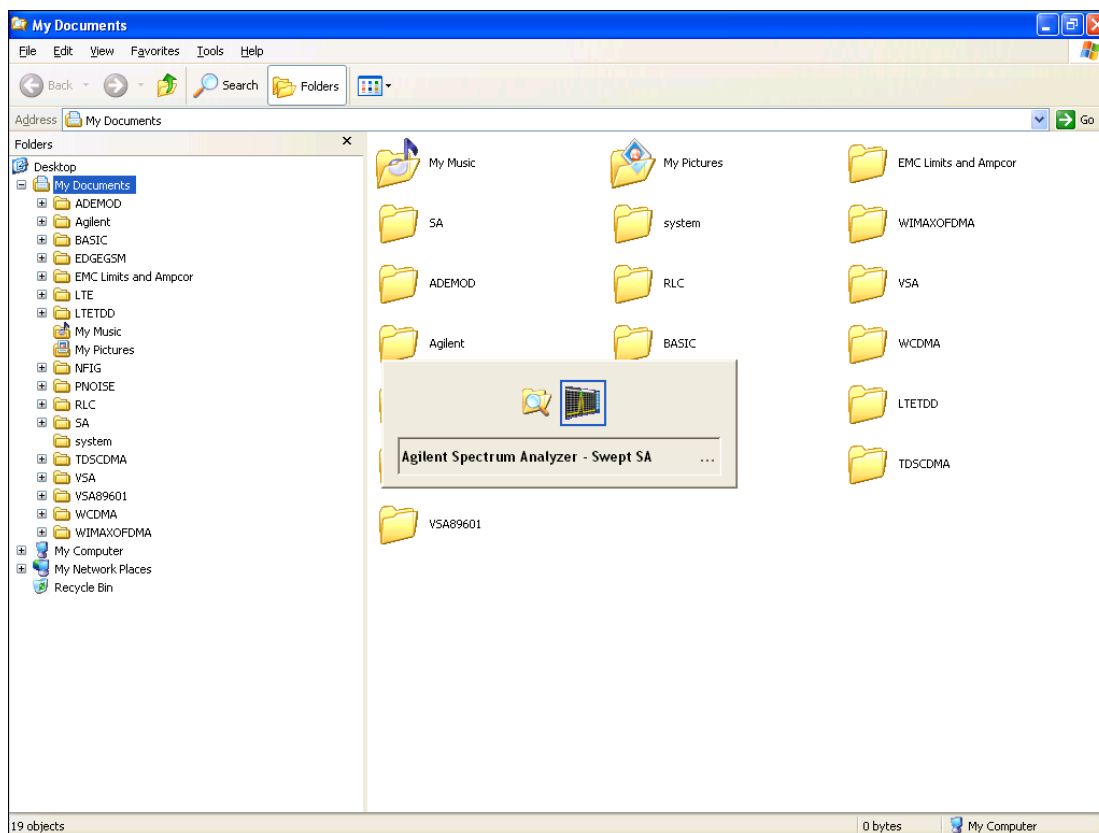
| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

File Explorer

Opens the standard Windows File Explorer. The File Explorer opens in the My Documents directory for the current user.

The File Explorer is a separate Windows application, so to return to the analyzer once you are in the File Explorer, you may either:

Exit the File Explorer by clicking on the red X in the upper right corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as shown above, then release the Alt key.

The ability to access File Explorer is not available if Option SF1 is installed.

| | |
|----------------------|------------------|
| Key Path | File |
| Initial S/W Revision | Prior to A.02.00 |

Print

The Print key opens a Print dialog for configured printing (for example, to the printer of your choice). Refer to your Microsoft Windows Operating System manual for more information.

Maximize/Restore Down

These keys allow the Instrument Application to be maximized and then restored to its prior state. Only one of the two keys is visible at a time. When not already maximized the Maximize Application key is visible, and when maximized, the Restore Down Application key is visible and replaces the Maximize Application key.

Maximize

This key allows you to Maximize the Instrument Application, which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| State Saved | No |
| Initial S/W Revision | A.05.01 |

Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

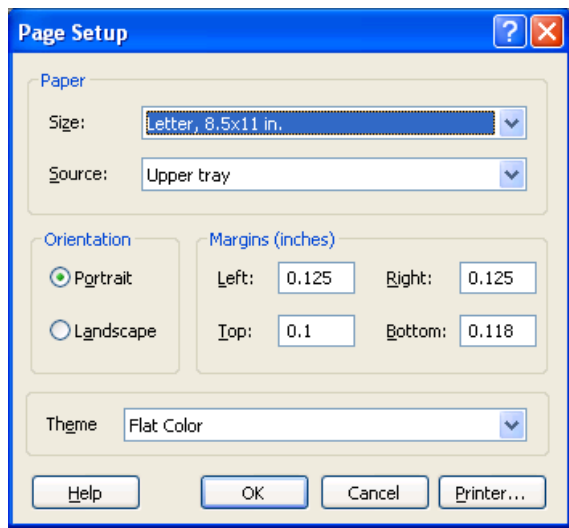
| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| State Saved | No |
| Initial S/W Revision | A.05.01 |

Page Setup

The Page Setup key brings up a Windows Page Setup dialog that allows you to control aspects of the pages sent to the printer when the PRINT hardkey is pressed.

| | |
|----------------------|------------------|
| Key Path | File |
| Initial S/W Revision | Prior to A.02.00 |

Paper size, the printer paper source, the page orientation and the margins are all settable. Just like any standard Windows dialog, you may navigate the dialog using the front-panel keys, or a mouse. There are no SCPI commands for controlling these parameters.



Also contained in this dialog is a drop-down control that lets you select the Theme to use when printing. For more on Themes, see information under View/Display, Display, System Display Settings, Theme. The Theme control has a corresponding SCPI command.

| | |
|----------------------|--|
| Parameter Name | Print Themes |
| Parameter Type | Enum |
| Mode | All |
| Remote Command | :SYSTEM:PRINT:THEMe TDCOLOR TDMONochrome FCOLOR FMONochrome :SYSTEM:PRINT:THEMe? |
| Example | :SYST:PRIN:THEM FCOL |
| Setup | :SYSTem:DEFault MISC |
| Preset | FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPY command is equivalent to pressing the PRINT key. The HCOPY:ABORT command can be used to abort a print which is already in progress. Sending HCOPY:ABORT will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORT command.

| | |
|-----------------------|------------------------|
| Key Path | Front-panel key |
| Remote Command | :HCOPY[:IMMEDIATE] |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--------------------------|
| Key Path | SCPI command only |
| Remote Command | :HCOPY:ABORT |
| Initial S/W Revision | Prior to A.02.00 |

Maximize

This key allows you to Maximize the Instrument Application, which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| State Saved | No |
| Initial S/W Revision | A.05.01 |

Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| State Saved | No |
| Initial S/W Revision | A.05.01 |

Minimize

The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see the Windows Desktop. You can use Alt-Tab (press and hold the Alt

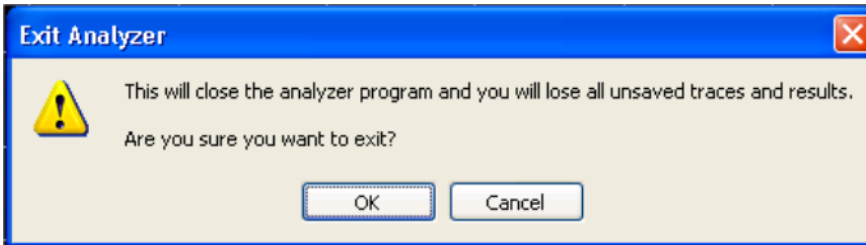


key and press and release the Tab key) to restore the analyzer display.

| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| State Saved | No |
| Initial S/W Revision | A.05.01 |

Exit

This key, when pressed, will exit the Instrument Application. A dialog box is used to confirm that you intended to exit the application:



| | |
|----------------------|--|
| Key Path | File |
| Mode | All |
| Notes | The Instrument Application will close. No further SCPI commands can be sent. Use with caution! |
| Initial S/W Revision | Prior to A.02.00 |

Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPY command is equivalent to pressing the PRINT key. The HCOPY:ABORT command can be used to abort a print which is already in progress. Sending HCOPY:ABORT will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORT command.

| | |
|-----------------------|------------------------|
| Key Path | Front-panel key |
| Remote Command | :HCOPY[:IMMEDIATE] |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--------------------------|
| Key Path | SCPI command only |
| Remote Command | :HCOPY:ABORT |
| Initial S/W Revision | Prior to A.02.00 |

System

Opens a menu of keys that access various configuration menus and dialogs.

| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Show

Accesses a menu of choices that enable you to select the information window you want to view.

| | |
|-----------------------------|--|
| Key Path | System |
| Mode | All |
| Remote Command | :SYSTem:SHOW OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPplication :SYSTem:SHOW? |
| Example | :SYST:SHOW SYST |
| Notes | This command displays (or exits) the various System information screens. |
| Preset | OFF |
| State Saved | No |
| Range | OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPplication |
| Initial S/W Revision | Prior to A.02.00 |

Errors

There are two modes for the Errors selection, History and Status.

The list of errors displayed in the Errors screen does not automatically refresh. You must press the Refresh key or leave the screen and return to it to refresh it.

History brings up a screen displaying the event log in chronological order, with the newest event at the top. The history queue can hold up to 100 messages (if a message has a repeat count greater than 1 it only counts once against this number of 100). Note that this count bears no relation to the size of the SCPI queue. If the queue extends onto a second page, a scroll bar appears to allow scrolling with a mouse. Time is displayed to the second.

Status brings up a screen summarizing the status conditions currently in effect. Note that the time is displayed to the second.

The fields on the Errors display are:

Type (unlabeled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) - This field shows the number of consecutive instances of the event, uninterrupted by other events. If an event occurs 5 times with no other intervening event, the value of repeat will be 5.

If the value of Repeat is 1 the field does not display. If the value of Repeat is >1, the time and date shown are those of the most recent occurrence. If the value of repeat reaches 999,999 it stops there.

Time - Shows the most recent time (including the date) at which the event occurred.

| | |
|-------------------------------|---|
| Key Path | System, Show |
| Mode | All |
| Remote Command | :SYSTem:ERRor[:NEXT]? |
| Example | :SYST:ERR? |
| Notes | The return string has the format: “<Error Number>,<Error>” Where <Error Number> and <Error> are those shown on the Show Errors screen |
| Backwards Compatibility Notes | In some legacy analyzers, the Repeat field shows the number of times the message has repeated since the last time the error queue was cleared. In the X-Series, the Repeat field shows the number of times the error has repeated since the last intervening error. So the count may very well be different than in the past even for identical signal conditions Unlike previous analyzers, in the X-Series all errors are reported through the Message or Status lines and are logged to the event queue. They never appear as text in the graticule area (as they sometimes do in previous analyzers) and they are never displayed in the settings panel at the top of the screen (as they sometimes do, by changing color, in previous analyzers). As a consequence of the above, the user can only see one status condition (the most recently generated) without looking at the queue. In the past, at least in the Spectrum Analyzer, multiple status conditions might display on the right side of the graticule. In general, there is no backwards compatibility specified or guaranteed between the error numbers in the X-Series and those of earlier products. Error, event, and status processing code in customers' software will probably need to be rewritten to work with X-Series. In the legacy analyzers, some conditions report as errors and others simply turn on status bits. Conditions that report as errors often report over and over as long as the condition exists. In the X-series, all conditions report as start and stop events. Consequently, software that repeatedly queries for a condition error until it stops reporting will have to be rewritten for the X-series. |
| Initial S/W Revision | Prior to A.02.00 |

Previous Page

See "[Next Page](#)" on page 280.

| | |
|----------------------|-----------------------------|
| Key Path | System, Show, Errors |
| Initial S/W Revision | Prior to A.02.00 |

Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

- If on the last page of the log, the Next Page key is grayed-out
- If on the first page of the log, the Previous Page key is grayed-out.
- If there is only one page, both keys are grayed out.

| | |
|----------------------|-----------------------------|
| Key Path | System, Show, Errors |
| Initial S/W Revision | Prior to A.02.00 |

History

The History and Status keys select the Errors view. The Status key has a second line that shows a number in [square brackets]. This is the number of currently open status items.

| | |
|----------------------|-----------------------------|
| Key Path | System, Show, Errors |
| Initial S/W Revision | Prior to A.02.00 |

Verbose SCPI On/Off

When you turn Verbose SCPI on, additional information is returned when you send the :SYSTem:ERRor? query. The additional information consists of the characters that stimulated the error. This can aid you in debugging your test programs by indicating where in the parsing of a SCPI command the instrument encountered an invalid command or query.

Specifically, with Verbose SCPI on, the SYSTem:ERRor? query is expanded to show the SCPI data received, with the indicator <Err> at the point in the stream that the error occurred.

Verbose SCPI has no effect on the Show Errors screen or front panel Message Line; it only changes the response to the :SYST:ERR? query.

See the example below, where the invalid command "SENS:BOGUS" is sent:

Normal response to :SYST:ERR (using the Telnet window):

```
SCPI> SENS:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header"
```

Now after turning on Verbose SCPI:

```
SCPI> SYST:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header;SYST:BOGUS<Err>"
```

| | |
|-----------------------|---|
| Key Path | System, Show, Errors |
| Mode | All |
| Remote Command | :SYSTem:ERRor:VERBoSe OFF ON 0 1 :SYSTem:ERRor:VERBoSe? |
| Example | :SYST:ERR:VERB ON |
| Preset | This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc" |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

Refresh

When pressed, refreshes the Show Errors display.

| | |
|----------------------|-----------------------------|
| Key Path | System, Show, Errors |
| Initial S/W Revision | Prior to A.02.00 |

Clear Error Queue

This clears all errors in all error queues.

Note the following:

- Clear Error Queue does not affect the current status conditions.
- Mode Preset does not clear the error queue.
- Restore System Defaults will clear all error queues.
- *CLS only clears the queue if it is sent remotely and *RST does not affect any error queue.
- Switching modes does not affect any error queues.

| | |
|----------------------|-----------------------------|
| Key Path | System, Show, Errors |
| Initial S/W Revision | Prior to A.02.00 |

Status

See "[History](#)" on page 280.

Input Overload Enable (Remote Command Only)

Input Overload errors are reported using the Input Overload status bit (bit 12 in the Measurement Integrity status register). Input Overloads (for example, ADC Overload errors) can come and go with great frequency, generating many error events (for example, for signals just on the verge of overload), and so are

not put into the SCPI error queue by default. Normally the status bit is the only way for detecting these errors remotely.

It is possible to enable Input Overload reporting to the SCPI queue, by issuing the :SYSTem:ERRor:OVERload ON command. To return to the default state, issue the :SYSTem:ERRor:OVERload OFF command. In either case, Input Overloads always set the status bit.

NOTE

For versions of firmware before A.10.01, the Input Overload was only a Warning and so was never available in the SCPI queue, although it did set the status bit. For A.10.01 and later, the Input Overload is an error and can be enabled to the SCPI queue using this command.

| | |
|-----------------------------|---|
| Key Path | SCPI only |
| Remote Command | :SYSTem:ERRor:OVERload[:STATe] 0 1 OFF ON |
| Example | :SYST:ERR:OVER 1 Enable overload errors |
| Preset | Set to OFF by Restore Misc Defaults (no Overload errors go to SCPI) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | A.10.01 |

Power Up (Remote Command Only)

This serves to show the errors encountered during the application boot-up, such as: mismatch FW-FPGA, missing Calibration data, missing hardware and construction errors.

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:ERRor:PUP? |
| Notes | If no error occurs, the return value will be: "No Power Up Errors." Return Value: <list of error strings>. <List of error strings> is an <IEEE488 Block> format. Return Value Example: "Power up errors, see details in Windows Event Log" "Unmatched FPGA Version(s), See details in Windows Event Log" |
| Initial S/W Revision | E.14.30 |

System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

| | | |
|--------------------------------------|-------------------------------------|---------|
| <Product Name> <Product Description> | | |
| Product Number: N9020A | | |
| Serial Number: US46220924 | | |
| Firmware Revision: A.01.01 | | |
| Computer Name: <hostname> | | |
| Host ID: N9020A,US44220924 | | |
| N9020A-503 | Frequency Range to 3.6 GHz | |
| N9020A-PFR | Precison Frequency Reference | |
| N9020A-P03 | Preamp 3.6 GHz | |
| N9060A-2FP | Spectrum Analysis Measurement Suite | 1.0.0.0 |
| N9073A-1FP | WCDMA | 1.0.0.0 |
| N9073A-2FP | WCDMA with HSDPA | 1.0.0.0 |

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

| | |
|-------------------------------|--|
| Key Path | System, Show |
| Mode | All |
| Example | SYST:SHOW SYST |
| Backwards Compatibility Notes | The hardware statistics that are displayed in the PSA Show System screen have been moved to a dedicated Show Hardware Statistics screen in the Service Menu. |
| Initial S/W Revision | Prior to A.02.00 |

Show System contents (Remote Command Only)

A remote command is available to obtain the contents of the Show System screen (the entire contents, not just the currently displayed page).

| | |
|-----------------------|---|
| Remote Command | :SYSTem:CONFigure[:SYSTem]? |
| Example | :SYST:CONF? |
| Notes | The output is an IEEE Block format of the Show System contents. Each line is separated with a new-line character. |
| Initial S/W Revision | Prior to A.02.00 |

Computer System description (Remote Command Only)

A remote command is available to obtain the Computer System description. The Computer System is the operating system and patch level as reported by operating system.

| | |
|-----------------------------|--|
| Remote Command | :SYSTem:CSYSem? |
| Example | :SYST:CSYS? |
| Notes | The return value is the Computer System name and service pack level. |
| Initial S/W Revision | Prior to A.12.00 |

Hardware

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

| Hardware Information | | | | | | | | | |
|--|------------|---------------------------|----------|-----|--------|-------|------------|--------------|------|
| Agilent EXM Wireless Test Set | | | | | | | | | |
| Product Number: E6640A | | | | | | | | | |
| Serial Number: US12341234 | | | | | | | | | |
| Instrument S/W Revision: E.14.00_R0133 | | | | | | | | | |
| Revision Date: 1/23/2014 10:33:35 AM | | | | | | | | | |
| Assembly Name | Part # | Serial # | Matl Rev | Rev | OF Rev | Hw Id | Cal Date | Cal Interval | Misc |
| Reference | M9300A | MY53000146 | | | | 0165 | | | |
| Reference Carrier | M9300A | W1312-63281-23-1306-00076 | | 01 | 1.2.1 | 0166 | | | |
| Reference Plugin | M9300A | W1312-63386-30-1306-00038 | | 01 | 1.3.0 | 0167 | | | |
| Wideband Digitizer | M943063005 | 111111111111 | 001 | 0 | 0 | 138 | | | |
| Downconverter | M943063006 | 111111111111 | 001 | 0 | A | 139 | | | |
| RFIO | M943063009 | 111111111111 | 001 | 0 | A | 140 | | | |
| Power Supply | M943063002 | 111111111111 | 001 | 0 | A | 141 | | | |
| M9430 TRX | 1234567890 | SN12344321 | 0 | 0 | 0 | 142 | 2013.10.02 | 2 years | |
| Baseband Generator | M943063007 | 111111111111 | 002 | 0 | 0 | 136 | | | |
| ModulatorSrcOutput | M943063008 | 111111111111 | 001 | 0 | A | 137 | | | |

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page of information is presently displayed.

| | |
|-----------------------------|---------------------|
| Key Path | System, Show |
| Mode | All |
| Example | SYST:SHOW HARD |
| Initial S/W Revision | Prior to A.02.00 |

System Remote Commands (Remote Commands Only)

The commands in this section have no front-panel key equivalent.

"System Powerdown (Remote Command Only)" on page 285

System Log Off (Remote Command Only)

"List installed Options (Remote Command Only)" on page 285

"Lock the Front-panel keys (Remote Command Only)" on page 285

"List SCPI Commands (Remote Command Only)" on page 286

"SCPI Version Query (Remote Command Only)" on page 286

"Date (Remote Command Only)" on page 286

"Time (Remote Command Only)" on page 287

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

System Powerdown (Remote Command Only)

| | |
|-----------------------|--|
| Remote Command | SYSTem:PDOWn [NORMal FORCe] |
| Notes | Shuts down the instrument in the normal way (NORMal) or forced way (FORCe). In case there is another application with modified data pending for saving, the application prompt the user. The system waits until the user responds in the normal mode. It will go off after 20 seconds of wait in the force mode and all data will be lost. |

List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer). .

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :SYSTem:OPTions? |
| Example | :SYST:OPT? |
| Notes | The return string is a comma separated list of the installed options. For example: "503,P03,PFR" :SYSTem:OPTions? and *OPT? are the same. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a "K" for "Klock" (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel 'Local' key (Cancel/Esc) has no effect if Klock is ON.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:KLOCK OFF ON 0 1 :SYSTem:KLOCK? |
| Example | :SYST:KLOC ON |
| Notes | Keyboard lock remains in effect until turned-off or the instrument is power-cycled |
| Preset | Initialized to OFF at startup, unaffected by Preset |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:HELP:HEADers? |
| Example | :SYST:HELP:HEAD? |
| Notes | The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A) |
| Initial S/W Revision | Prior to A.02.00 |

SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

| | |
|-----------------------|------------------|
| Remote Command | :SYSTem:VERSion? |
| Example | :SYST:VERS? |
| Initial S/W Revision | Prior to A.02.00 |

Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|-----------------------|--|
| Remote Command | :SYSTem:DATE "<year>,<month>,<day>" :SYSTem:DATE? |
| Example | :SYST:DATE "2006,05,26" |
| Notes | <year> is the four digit representation of year. (for example, 2006) <month> is the two digit representation of year. (for example. 01 to 12) <day> is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31) depending on the month and year Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken. |
| Initial S/W Revision | Prior to A.02.00 |

Time (Remote Command Only)

Sets or queries the time in the instrument.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:TIME "<hour>,<minute>,<second>" :SYSTem:TIME? |
| Example | :SYST:TIME "13,05,26" |
| Notes | <hour> is the two digit representation of the hour in 24 hour format <minute> is the two digit representation of minute <second> is the two digit representation of second Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken. |
| Initial S/W Revision | Prior to A.02.00 |

Module Name (Remote Command Only)

Query only. This will return the name of the instance as displayed on the xSA main window.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :SYSTem:MODule:NAME? |
| Example | :SYST:MOD:NAME? |
| Notes | If the first instance displays on the xSA main window, the return string is "TRX1". If the second instance displays on the main window, the return string is "TRX2". If the third instance displays on the main window, the return string is "TRX3". If the fourth instance displays on the main window, the return string is "TRX4". |
| Preset | Not affected by Preset, reset to "Left" with Restore System Defaults Misc. |

| | |
|----------------------|---------|
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module Index (Remote Command Only)

Query only. This will return the index of this xSA instance. This index is used as the device number in a VISA address (“hislip#”).

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:MODule:INDex? |
| Example | :SYST:MOD:IND? |
| Notes | It returns 0 if this instance’s device number in a VISA address is 0. It returns 1 if this instance’s device number in a VISA address is 1. |
| Preset | Not affected by Preset, reset to 0 with Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module Mnemonic (Remote Command Only)

Query only. This will return the mnemonic of the instance as used in the command line “/Process:<mnemonic>” argument.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :SYSTem:MODule:MNEMonic? |
| Example | :SYST:MOD:MNEM? |
| Notes | This will return the mnemonic of the instance as used in the command line “/Process:<mnemonic>” argument. |
| Preset | Not affected by Preset and Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module List (Remote Command Only)

Query only. This will return the list of defined mnemonics that can be used in the command line “/Process:<mnemonic>” argument with corresponding configuration information. The comma separated return values are: mnemonic, display name, Enabled/Disabled, VISA device id (instr# or hislip#), telnet port, socket port, Physics port, Physics configuration tag.

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|-----------------------------|--|
| Remote Command | :SYSTem:MODule:LIST? |
| Example | :SYST:MOD:LIST? |
| Notes | Example: it returns: TRX1,TRX1,Enabled,0,5023,5025,3574,E6650AModules.config#TRX1 TRX2,TRX2,Disabled,1,5123,5125,3575,E6650AModules.config#TRX2 TRX3,TRX3,Disabled,2,5223,5225,3576,E6650AModules.config#TRX3 TRX4,TRX4,Disabled,3,5323,5325,3577,E6650AModules.config#TRX4 |
| Preset | Not affected by Preset, reset to 0 with Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module Enable (Remote Command Only)

Query and command. The query SYST:MOD:ENAB? "<mnemonic>" returns "0" for disabled, "1" for enabled. The command SYST:MOD:ENAB "<mnemonic>" 0|1 will disable/enable the configuration.

Notes: Enabling a configuration that does not have a HW will result in run-time errors when trying to start that configuration. Trying to disable the default configuration will result in the error: -221, "Setting conflict:Cannot disable default process configuration '<mnemonic>'".

Example:

```
}
```

```
SCPI>>syst:mod:enab? "TRX1"
```

```
<<1
```

```
SCPI>>syst:mod:enab? "TRX2"
```

```
<<0
```

```
SCPI>>syst:err?
```

```
<<+0,"No error"
```

```
SCPI>>syst:mod:enab "TRX1",0
```

```
SCPI>>syst:err?
```

```
<<-221,"Settings conflict;Cannot disable default process configuration 'TRX1'"
```

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :SYSTem:MODule:ENABle? "<mnemonic>" :SYSTem:MODule:ENABle "<mnemonic>",0 1 |
| Example | |

| | |
|--|-------------------------|
| | :SYST:MOD:ENAB? "TRX1" |
| | :SYST:MOD:ENAB "TRX4",0 |

| | |
|----------------------|--|
| Preset | Not affected by Preset and Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module Default (Remote Command Only)

Query and command. The query SYST:MOD:DEF? returns the mnemonic of the default configuration. The command SYST:MOD:DEF "mnemonic" will set that configuration as the default. If the configuration was disabled, the module default command on it will enable this configuration.

Example:

```
SCPI>>syst:mod:def?
<<"TRX1"
SCPI>>syst:mod:enab "TRX2",0
SCPI>>syst:mod:enab? "TRX2"
<<0
SCPI>>syst:mod:def "TRX2"
SCPI>>syst:mod:enab? "TRX2"
<<1
SCPI>>syst:mod:def?
<<"TRX2"
```

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:MODule:DEFault? :SYSTem:MODule:DEFault "<mnemonic>" |
| Example | :SYST:MOD:DEF? :SYST:MOD:DEF "TRX1" |

| | |
|----------------------|--|
| Preset | Not affected by Preset, reset to "Left" with Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | A.13.80 |

Module Model Number (Remote Command Only)

Query only. The query ":SYST:MODule:MODEl?" will return model number of the current module.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:MODule:MODe1? |
| Example | :SYSTem:MODule:MODe1? |
| Notes | This query will return model number. e.g. "M9430A" |
| Preset | Not affected by Preset, |
| State Saved | No |
| Initial S/W Revision | E.14.14 |

Module Model Serial Number (Remote Command Only)

Query only. The query ":SYST: MODule:SERial?" will return model serial number of the current module.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :SYSTem:MODule:SERial? |
| Example | :SYSTem:MODule:SERial? |
| Notes | This query will return model serial number like "SN12344321" |
| Preset | Not affected by Preset |
| State Saved | No |
| Initial S/W Revision | E.14.14 |

Power On

Enables you to select how the instrument should power on. The options are: Mode and Input/Output Defaults, User Preset and Last State.

| | |
|-------------------------------------|---|
| Key Path | System |
| Mode | All |
| Remote Command | :SYSTem: PON:TYPE MODE USER LAST :SYSTem: PON:TYPE? |
| Example | :SYST: PON:TYPE MODE |
| Preset | This is unaffected by a Preset but is set to Mode on a "Restore System Defaults->All" |
| State Saved | No |
| Backwards Compatibility SCPI | :SYSTem: PON:TYPE PRESet the "PRESet" parameter is supported for backward compatibility only and behaves the same as MODE. |
| Backwards Compatibility Notes | The Preset Type key in legacy analyzers has been removed, and the Power On toggle key has been replaced by this 1-of-N key in the System menu. |
| Initial S/W Revision | Prior to A.02.00 |

Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it performs a Restore Mode Defaults to all modes in the instrument and also performs a Restore Input/Output Defaults.

Persistent parameters (such as Amplitude Correction tables or Limit tables) are not affected at power on, even though they are normally cleared by Restore Input/Output Defaults and/or Restore Mode Defaults.

| | |
|----------------------|-------------------------|
| Key Path | System, Power On |
| Mode | All |
| Example | SYST:PON:TYPE MODE |
| Readback Text | Defaults |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

NOTE

An instrument could never power up for the first time in User Preset.

| | |
|-------------------------------|--|
| Key Path | System, Power On |
| Mode | All |
| Example | SYST:PON:TYPE USER |
| Readback Text | User Preset |
| Backwards Compatibility Notes | Power On User Preset will cause the instrument to power up in the power-on mode, not the last mode the instrument was in prior to shut down. Also, Power On User Preset will User Preset all modes. This does not exactly match legacy behavior. |
| Initial S/W Revision | Prior to A.02.00 |

Last State

Sets **Power On** to **Last**. When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power **Standby** key or by using the remote command `SYSTem:PDOWn`. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

NOTE

An instrument can never power up for the first time in Last.

If line power to the analyzer is interrupted, for example by pulling the line cord plug or by switching off power to a test rack, Power On Last State may not work properly. For proper operation, Power On Last State depends on you shutting down the instrument using the Standby key or the SYSTem:PDOWn SCPI command. This will ensure the last state of each mode is saved and can be recalled during a power up.

| | |
|-------------------------------|--|
| Key Path | System, Power On |
| Mode | All |
| Example | SYST:PON:TYPE LAST |
| Notes | Power on Last State only works if you have done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command. |
| Readback Text | Last State |
| Backwards Compatibility Notes | It is no longer possible to power-up the analyzer in the last mode the analyzer was running with that mode in the preset state. (ESA/PSA SYST:PRESET:TYPE MODE with SYST:PON:PRESET) You can power-on the analyzer in the last mode the instrument was running in its last state (SYST:PON:TYPE LAST), or you can specify the mode to power-up in its preset state (SYST:PON:MODE <mode>). |
| Initial S/W Revision | Prior to A.02.00 |

Power On Application

Accesses a menu that lists the available Modes and lets you select which Mode is to be the power-on application.

This application is used for Power On Type “Mode and Input/Output Defaults” and Restore System Defaults All.

| | |
|-----------------------|---|
| Key Path | System, Power On |
| Mode | All |
| Remote Command | :SYSTem:PON:MODE SA BASIC ADEMOD NFIGURE PNOISE CDMA2K TDSCDMA VSA VSA89601 WCDMA WIMAXOFDMA :SYSTem:PON:MODE? |
| Example | SYST:PON:MODE SA |
| Notes | The list of possible modes (and remote parameters) to choose from is dependent on which modes are installed in the instrument. |
| Preset | This is unaffected by a Preset but is set on a “Restore System Defaults->All” to: |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

Configure Applications

The Configure Applications utility can be used to:

- select applications for preload
- determine how many applications can fit in memory at one time
- specify the order of the Modes in the Mode menu.

This utility consists of a window with instructions, a set of “Select Application” checkboxes, a “fuel bar” style memory gauge, and keys that help you set up your configuration.

For more information, see the following topics:

["Preloading Applications" on page 294](#)

["Access to Configure Applications utility" on page 294](#)

["Virtual memory usage" on page 295](#)

| | |
|----------------------|---|
| Key Path | System, Power On |
| Example | :SYST:SHOW CAPP Displays the Config Applications screen |
| Initial S/W Revision | A.02.00 |

Preloading Applications

During runtime, if a Mode that is not preloaded is selected using the Mode menu or sending SCPI commands, there will be a pause while the Application is loaded. During this pause a message that says “Loading application, please wait ...” is displayed. Once loaded, the application stays loaded, so the next time you select it during a session, there is no delay.

Preloading enables you to “preload” at startup, to eliminate the runtime delay. Preloading an application will cause it to be loaded into the analyzer’s memory when the analyzer program starts up. If you do this, the delay will increase the time it takes to start up the analyzer program, but this may be preferable to having to wait the first time you select an application. Note that, once an application is loaded into memory, it cannot be unloaded without exiting and restarting the analyzer program.

Note that there are more applications available for the X-Series than can fit into Windows Virtual Memory. By allowing you to choose which licensed applications to load at startup, the Configure Applications utility allows you to make optimal use of your memory.

Access to Configure Applications utility

A version of the utility runs the first time you power up the analyzer after purchasing it from Keysight. The utility automatically configures preloads so that as many licensed applications as possible are preloaded while keeping the total estimated virtual memory usage below the limit. This auto-configuration only takes place at the very first run, and after analyzer software upgrades.

You may, at any time, manually call up the Configure Applications utility by pressing System, Power On, Configure Applications, to find a configuration that works best for you, and then restart the analyzer program.

The utility may also be called if, during operation of the analyzer, you attempt to load more applications than can fit in memory at once.

Virtual memory usage

There are more applications available for the X-Series than can fit into memory at any one time, so the Configure Applications utility includes a memory tracker that serves two purposes:

1. It will not let you preload more applications than will fit into memory at once.
2. You can determine how many of your favorite applications can reside in memory at one time.

The utility provides a graphical representation of the amount of memory (note that the memory in question here is Virtual memory and is a limitation imposed by the operating system, not by the amount of physical memory you have in your analyzer). You select applications to preload by checking the boxes on the left. Checked applications preload at startup. The colored fuel bar indicates the total memory required when all the checked applications are loaded (either preloaded or selected during runtime).

Here is what the fuel bar colors mean:

RED: the applications you have selected cannot all fit into the analyzer's memory. You must deselect applications until the fuel bar turns yellow.

YELLOW: the applications you have selected can all fit into the analyzer's memory, but there is less than 10% of the memory left, probably not enough to load any other applications, either via preload or by selecting a Mode while the analyzer is running..

GREEN: The indicator is green when <90% of the memory limit is consumed. This means the applications you have selected can all fit into the analyzer's memory with room to spare. You will likely be able to load one or more other applications without running out of memory.

Select All

Marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

| | |
|----------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |

Deselect All

Clears the marks from all applications in the selection list, except the Power On application. The Power On application cannot be eliminated from the pre-load list.

| | |
|----------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |

Move Up

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

| | |
|----------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |

Move Down

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application down in the list, thus moving the selected application later in the Mode Menu.

| | |
|----------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |

Select/Deselect

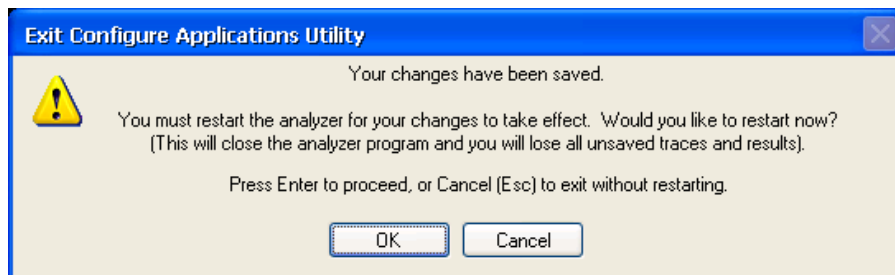
Toggles the currently highlighted application in the list.

| | |
|----------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |

Save Changes and Exit

Applies the configuration of the applications list. The marked applications will be pre-loaded in memory the next time the instrument application is started, and the order of the applications in the list will be the order of the applications in the Mode Menu.

After saving your changes, the analyzer asks you if you would like it to restart so that your changes can take effect (see dialog box, below). If you choose not to restart, the changes will not take affect until the next time you shut down and restart the analyzer.



| | |
|----------------|---|
| Key Path | System, Power On, Configure Applications |
| Remote Command | :SYSTem:PUP:PROcess |
| Example | :SYST:PUP:PROC This is the SCPI command for restarting the analyzer. You must Wait after this |

| | |
|--------------------------|---|
| | command for the instrument application to restart |
| Notes | The softkey will be grayed-out when the virtual memory of the selected applications exceeds 100% of the limit. |
| Notes | You cannot use *WAI or *OPC? to synchronize operation after a restart. This command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded. |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.04.00 |

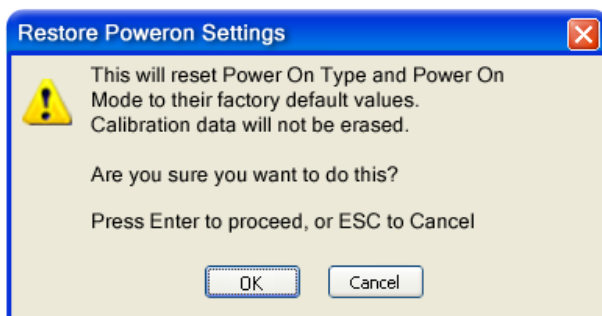
Exit Without Saving

Pressing this key will exit the Configure Applications utility without saving your changes.

| | |
|--------------------------|---|
| Key Path | System, Power On, Configure Applications |
| Initial S/W Revision | A.02.00 |
| Modified at S/W Revision | A.04.00 |

Restore Power On Defaults

This selection causes the Power On Type and Power On Application settings to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On key, under the Restore System Defaults menu, causes the same action.



If you press any key other than OK or Enter, it is construed as a Cancel, because the only path that will actually cause the reset to be executed is through OK or Enter.

| | |
|----------------------|-------------------------|
| Key Path | System, Power On |
| Example | :SYST:DEF PON |
| Initial S/W Revision | Prior to A.02.00 |

Configure Applications - Instrument boot-up

At start-up of the analyzer program a dialog box similar to the one under the **System, Power On, Configure Applications** key will be displayed allowing you to choose which licensed applications are to be loaded. This dialog will only be displayed if the memory required to pre-load all of the licensed applications exceeds the Virtual Memory available.

Configure Applications - Windows desktop

The Configure Applications Utility may be run from the Windows Desktop. The utility is launched by double-



clicking the icon on the desktop, which brings-up a dialog box similar to the one under the **System, Power On, Configure Applications** key, allowing you to choose which licensed applications are to be loaded when the analyzer program starts up. This dialog box has mouse buttons on it that do the job the softkeys normally do in the **System, Power On, Configure Applications** menu.

Configure Applications - Remote Commands

The following topics provide details on using remote commands to configure the list of applications you want to load into the instrument memory or query the Virtual Memory utilization for your applications.

- "Configuration list (Remote Command Only)" on page 298
- "Configuration Memory Available (Remote Command Only)" on page 299
- "Configuration Memory Total (Remote Command Only)" on page 299
- "Configuration Memory Used (Remote Command Only)" on page 299
- "Configuration Application Memory (Remote Command Only)" on page 299

Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

| | |
|-----------------------------|--|
| Remote Command | :SYSTem:PON:APPLication:LLISt <string of INSTRument:SElect names> :SYSTem:PON:APPLication:LLISt? |
| Example | :SYST:PON:APPL:LLIS "SA,BASIC,WCDMA" |
| Notes | <string of INSTRument:SElect names> are from the enums of the :INSTRument:SElect command. The order of the <INSTRument:SElect names> is the order that the applications are loaded into memory, and the order that they appear in the Mode Menu. Error message -225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. When this occurs, the existing applications load list is unchanged. |
| Preset | Not affected by Preset |
| State Saved | Not saved in instrument state |
| Initial S/W Revision | A.02.00 |

Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

| | |
|-----------------------|--|
| Remote Command | :SYSTem:PON:APPLication:VMEMory[:AVAILable]? |
| Example | :SYST:PON:APPL:VMEM? |
| Preset | Not affected by Preset |
| Initial S/W Revision | A.02.00 |

Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

| | |
|-----------------------|--|
| Remote Command | :SYSTem:PON:APPLication:VMEMory:TOTal? |
| Example | :SYST:PON:APPL:VMEM:TOT? |
| Preset | Not affected by Preset |
| Initial S/W Revision | A.02.00 |

Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

| | |
|-----------------------|---------------------------------------|
| Remote Command | :SYSTem:PON:APPLication:VMEMory:USED? |
| Example | :SYST:PON:APPL:VMEM:USED? |
| Preset | Not affected by Preset |
| Initial S/W Revision | A.02.00 |

Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

| | |
|-----------------------|--|
| Remote Command | :SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTRument:SElect name> |
| Example | :SYST:PON:APPL:VMEM:USED:NAME? CDMA2K |
| Notes | <INSTRument:SElect name> is from the enums of the :INSTRument:SElect command Value returned will be 0 (zero) if the name provided is invalid. |
| Preset | Not affected by Preset |
| Initial S/W Revision | Prior to A.02.00 |

Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specifications to be impacted.



| Key Path | System |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

| Key Path | System, Alignments |
|----------------------|--------------------|
| Initial S/W Revision | Prior to A.02.00 |

All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The “All” alignment is sufficient to maintain specified performance, provided that (1) the TRX’s internal temperature has not drifted more than +/-5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous “All” alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up period between power-up of the TRX and invoking the “All” alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is generated. In addition the Error Condition message “Align Now, RF required” is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or *CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now, All** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORT SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All**.

| | |
|-------------------------------------|---|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration[:ALL] :CALibration[:ALL]? |
| Example | :CAL |
| Notes | :CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORT command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed. |
| Couplings | Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature. |
| Status Bits/OPC dependencies | Bits 11, 12, or 14 may be set in the Status Questionable Calibration register. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|----------------------|---|
| Mode | All |
| Remote Command | *CAL? |
| Example | *CAL? |
| Notes | <p>*CAL? returns 0 if successful</p> <p>*CAL? returns 1 if failed</p> <p>:CALibration[:ALL]? is the same as *CAL?</p> <p>See additional remarks described with :CALibration[:ALL]?</p> <p>Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings</p> |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|----------------------|--|
| Mode | All |
| Remote Command | :CALibration[:ALL]:NPENding |
| Example | CAL:NPEN |
| Notes | <p>:CALibration[:ALL]:NPENding is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not.</p> <p>Typical usage is:</p> <ol style="list-style-type: none"> 1) :CALibration:ALL:NPENding (Start a calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3):STATus:QUEStionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure |
| Initial S/W Revision | X.14.20 |

All but RF

Immediately executes an alignment of all subsystems except the RF subsystem which includes both the source and the analyzer in the TRX module . The instrument will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of **All** if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

The query form of the remote commands (:CALibration:NRF?) will invoke the alignment and return a success or failure value.

Successful completion of Align Now, All but RF will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition message “Align Now, RF required” is generated and bit 12 in

the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

Align Now, All but RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be used for an individual subsystem, but not a full new set of data for all subsystems.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All but RF**.

| | |
|------------------------------|---|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration:NRF :CALibration:NRF? |
| Example | :CAL:NRF |
| Notes | :CALibration:NRF? returns 0 if successful :CALibration:NRF? returns 1 if failed While Align Now, All but RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register and set bit 12 if invoked with “Align Now, All required”. |
| Couplings | Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. |
| Status Bits/OPC dependencies | Bits 12 or 14 may be set in the Status Questionable Calibration register. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|----------------|--|
| Mode | All |
| Remote Command | :CALibration:NRF:NPENding |
| Example | CAL:NRF:NPEN |
| Notes | :CALibration:NRF:NPENding is the same as :CALibration:NRF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:NRF:NPENding (start theAll but RF calibration) 2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared) |

| | |
|----------------------|--|
| | 3):STATus:QUEStionable:CALibration:CONDition? (to check if there are any errors/failures in previous calibration procedure) |
| Initial S/W Revision | X.14.20 |

RF (Weekly use)

Immediately executes an alignment of the RF subsystem which includes both the source and the analyzer in the TRX module . The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and generate the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

Successful completion of Align Now, RF will begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition message “Align Now, RF required” is generated, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

NOTE

In EXF, Source ARB play will be turned off and the source states will not be restored after **Align Now, All but RF**.

| | |
|----------------|---|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration:RF :CALibration:RF? |
| Example | :CAL:RF |
| Notes | :CALibration:RF? returns 0 if successful :CALibration:RF? returns 1 if failed (including interfering user signal) While Align Now, RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the |

| | |
|------------------------------|--|
| | <p>:ABORt command.</p> <p>Successful completion clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register.</p> <p>A failure encountered during alignment will generate the Error Condition message “Align RF failed” and set bit 3 in the Status Questionable Calibration register.</p> <p>An interfering user signal will result in bits 11 and 12 to be set in the Status Questionable Calibration register to indicate Align Now, RF is required.</p> <p>An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.</p> |
| Couplings | <p>Initializes the time for the Last Align Now, RF Time.</p> <p>Records the temperature for the Last Align Now, RF Temperature.</p> |
| Status Bits/OPC dependencies | Bits 11, 12, or 14 may be set in the Status Questionable Calibration register. |
| Initial S/W Revision | Prior to A.02.00 |
| Mode | All |
| Remote Command | :CALibration:RF:NPENding |
| Example | CAL:RF:NPEN |
| Notes | <p>:CALibration:RF:NPENding is the same as :CALibration:RF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not.</p> <p>Typical usage is:</p> <ol style="list-style-type: none"> 1):CALibration:RF:NPENding (Start a RF calibration) 2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared) 3):STATus:QUESTionable:CALibration:CONDition? (to check if there are any errors/failures in previous calibration procedure) |
| Initial S/W Revision | X.14.20 |

Source (Weekly use)

Accesses source alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Immediately executes an IQ alignment, and power level alignment. The instrument stops any sequence of the source, performs the alignment, then restarts the sequence from the beginning.

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

There is no alert available for the source alignment. The operators have the responsibility to check temperature shift since last Align Now, Source to determine if the source alignment needs to be executed.

| | |
|-----------------------------|--|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration:INTernal:SOURce[:ALL] :CALibration:INTernal:SOURce[:ALL]? |
| Example | :CAL:INT:SOUR |
| Notes | :CAL:SOUR? Initiates an Alignment and returns 0 if successful :CAL:SOUR? Initiates an Alignment and returns 1 if failed |
| Couplings | Initializes the time for the Last Align Source Now, All Time. Records the temperature for the Last Align Source Now, All Temperature. |
| Initial S/W Revision | A.05.00 |

| | |
|-----------------------------|---|
| Mode | All |
| Remote Command | :CALibration:INTernal:SOURce[:ALL]:NPENDING |
| Example | CAL:INT:SOUR:NPEN |
| Notes | :CALibration:INTernal:SOURce[:ALL]:NPENDING is the same as :CALibration:INTernal:SOURce[:ALL] including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:INTernal:SOURce:NPENDING (start an internal source calibration) 2):STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3):STATus:QUEStionable:CALibration:EXTended:FAILure:CONDition? (Check if bit 14 is set or not. If this bit is set, that means there are some errors in previous internal source calibration) |
| Initial S/W Revision | X.14.20 |

IF Alignment (Weekly use)

Immediately executes an alignment of the IF subsystem which includes both the source and the analyzer in the TRX module. The instrument stops any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This alignment corrects slow-rate which the drift does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >4 minutes to complete.

A failure of IF will set the Error Condition “Align IF failed” and set bit 4 in the Status Questionable Calibration register. A failure will not employ new IF alignment data.

Successful completion of IF will clear the Error Condition “Align IF failed” and clear bit 6 in the Status Questionable Calibration register.

Align IF can be interrupted by pressing the Cancel (ESC) front-panel key or from remote with Device Clear followed by the :ABORt SCPI command. When this occurs, no new IF alignment data will be employed.

The query form of the remote commands (:CALibration:IF?) will invoke the alignment of the IF subsystem and return a success or failure value.

Note: In EXF, Source ARB play will be turned off and the source states will not be restored after IF Alignment.

| | |
|-----------------------|--|
| Key Path | System, Alignments, Align Now |
| Mode | All |
| Remote Command | :CALibration:IF :CALibration:IF? |
| Example | :CAL:IF |
| Notes | :CALibration:IF? returns 0 if successful :CALibration:IF? returns 1 if failed While Align Now, IF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register. |
| Preset | Not affected by Preset and Restore System Defaults Misc. |
| State Saved | No |
| Initial S/W Revision | E.14.00 |

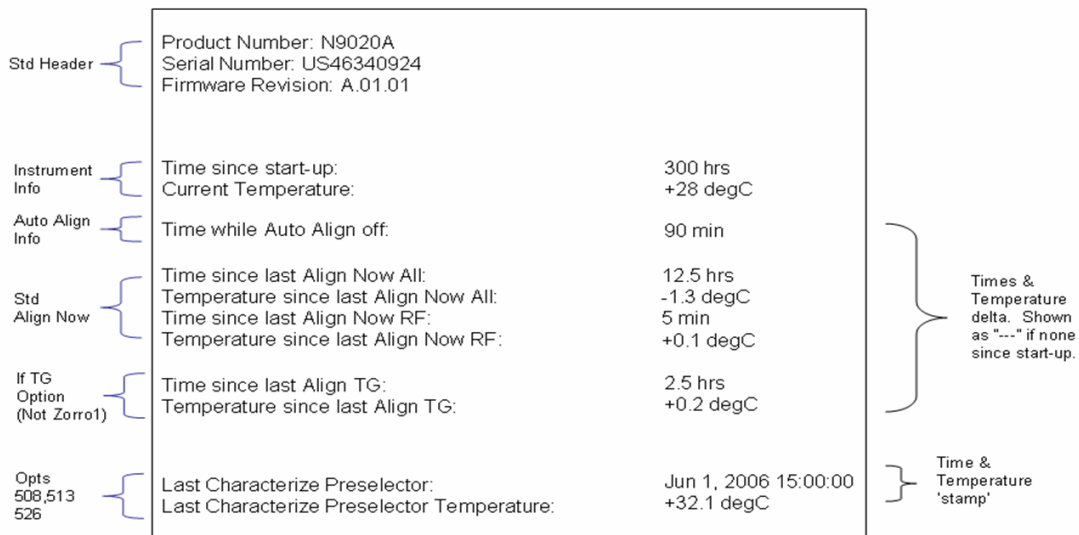
| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALibration:IF:NPENding |
| Example | CAL:IF:NPEN |
| Notes | :CALibration:IF:NPENding is the same as :CALibration:IF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:IF:NPENding (Start a IF calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared) 3) :STATus:QUEStionable:CALibration:CONDition? (Check if bit 4 is set or not. If this bit is set, that means there are some errors in previous internal source calibration) |
| Initial S/W Revision | X.14.20 |

Show Alignment Statistics

Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands that access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

| Key Path | System, Alignments |
|----------------------|---|
| Mode | All |
| Notes | The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed. |
| Initial S/W Revision | Prior to A.02.00 |

| Key Path | Visual annotation in the Show Alignment Statistics screen |
|----------------|--|
| Mode | All |
| Remote Command | :SYSTem:PON:TIME? |
| Example | :SYST:PON:TIME? |
| Notes | Value is the time since the most recent start-up in seconds. |

| | |
|----------------------|------------------|
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Key Path | Visual annotation in the Show Alignment Statistics screen |
| Mode | All |
| Remote Command | :CALibration:TEMPerature:CURRent? |
| Example | :CAL:TEMP:CURR? |
| Notes | Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required) |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Visual annotation in the Show Alignment Statistics screen |
| Mode | All |
| Remote Command | :CALibration:TIME:LALL? |
| Example | :CAL:TIME:LALL? |
| Notes | Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Key Path | Visual annotation in the Show Alignment Statistics screen |
| Mode | All |
| Remote Command | :CALibration:TEMPerature:LALL? |
| Example | :CAL:TEMP:LALL? |
| Notes | Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF was executed. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Visual annotation in the Show Alignment Statistics screen |
| Mode | All |
| Remote Command | :CALibration:TIME:LRF? |
| Example | :CAL:TIME:LRF? |

| | |
|----------------------|---|
| Notes | Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Visual annotation in the Show Alignment Statistics screen |
| Mode | All |
| Remote Command | :CALibration:TEMPerature:LRF? |
| Example | :CAL:TEMP:LRF? |
| Notes | Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All. |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

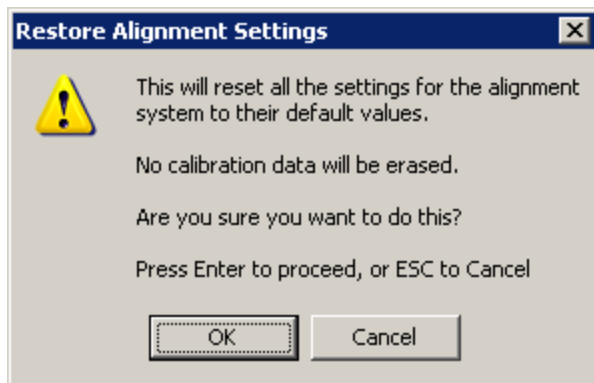
| | |
|-----------------------|---|
| Key Path | SCPI Only |
| Mode | All |
| Remote Command | :CALibration:TIME:LIF? |
| Example | :CAL:TIME:LIF? |
| Notes | Value is the elapsed time, in seconds, since the last successful Align IF was executed. |
| State Saved | No |
| Initial S/W Revision | A.14.50 |

| | |
|-----------------------|--|
| Key Path | SCPI Only |
| Mode | All |
| Remote Command | :CALibration:TEMPerature:LIF? |
| Example | :CAL:TEMP:LIF? |
| Notes | Value is in degrees Centigrade at which the last successful Align IF was executed. |
| State Saved | No |
| Initial S/W Revision | A.14.50 |

Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

| Parameter | Setting |
|-----------------------|--|
| Timebase DAC | Calibrated |
| Timebase DAC setting | Calibrated value |
| Auto Align State | Normal (if the instrument is not operating with default alignment data, Off otherwise) |
| Auto Align All but RF | Off |
| Auto Align Alert | Time & Temperature |

| | |
|----------------------|--|
| Key Path | System, Alignments |
| Mode | All |
| Example | :SYST:DEF ALIG |
| Notes | Alignment processing that results as the transition to Auto Alignment Normal will be executed sequentially; thus *OPC? or *WAI will wait until the alignment processing is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Execute Expired Alignments (Remote Command Only)

Alignments can be expired in the situation where Auto Align is in the state of Partial or Off. This feature runs the alignments that have expired. This is different than performing an Align All, Now operation. Align All, Now performs an alignment of all subsystems regardless of whether they are needed or not, with Execute Expired Alignments, only the individual subsystems that have become due are aligned.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALibration:EXPIred? |
| Example | :CAL:EXP? |
| Notes | :CALibration:EXPIred? returns 0 if successful |

| | |
|----------------------|---|
| | :CALibration:EXPIred? returns 1 if failed |
| Initial S/W Revision | Prior to A.02.00 |

I/O Config

Activates a menu for identifying and changing the I/O configuration for remote control.

| | |
|----------------------|------------------|
| Key Path | System |
| Initial S/W Revision | Prior to A.02.00 |

SCPI LAN

Activates a menu for identifying and changing the SCPI over a LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

| | |
|----------------------|---------------------------|
| Key Path | System, I/O Config |
| Initial S/W Revision | Prior to A.02.00 |

SCPI Telnet

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over LAN through telnet.

| | |
|-----------------------|--|
| Key Path | System, I/O Config, SCPI LAN |
| Mode | All |
| Remote Command | :SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle? |
| Example | :SYST:COMM:LAN:SCPI:TELN:ENAB OFF |
| Preset | This is unaffected by Preset but is set to ON with a "Restore System Defaults->Misc" |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

| | |
|-----------------------|--|
| Key Path | System, I/O Config, SCPI LAN |
| Mode | All |
| Remote Command | :SYSTem:COMMunicate:LAN:SCPI:SOCKEt:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SOCKEt:ENABle? |
| Example | :SYST:COMM:LAN:SCPI:SOCK:ENAB OFF |
| Preset | This is unaffected by a Preset but is set to ON with a “Restore System Defaults->Misc” |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

| Parameter | Description | Setting |
|----------------------------|--|---------|
| Maximum Connections | The maximum number of connections that can be accessed simultaneously | 5 |
| Instrument Name | The name (same as the remote SICL address) of your analyzer | inst0 |
| Instrument Logical Unit | The unique integer assigned to your analyzer when using SICL LAN | 8 |
| Emulated GPIB Name | The name (same as the remote SICL address) of the device used when communicating with your analyzer | gpib7 |
| Emulated GPIB Logical Unit | The unique integer assigned to your device when it is being controlled using SICL LAN | 8 |
| Emulated GPIB Address | The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address) | 18 |

| | |
|-----------------------|--|
| Key Path | System, I/O Config, SCPI LAN |
| Mode | All |
| Remote Command | :SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle? |
| Example | :SYST:COMM:LAN:SCPI:SICL:ENAB OFF |
| Preset | This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc” |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

HiSLIP Server

Turns the HiSLIP server capability On or Off, enabling you to limit SCPI access over LAN through the HiSLIP server.

HiSLIP stands for High Speed LAN Instrument Protocol and is part of the IVI-6.1 specification.

Here is an example of a VISA connection string used to connect to the HiSLIP Server on an X-Series Spectrum Analyzer:

```
TCPIP0::a-n9030a-93016::hislip0::INSTR
```

In the example above, hislip0 is the HiSLIP device name that VISA users must include in their HiSLIP VISA Address strings. Your HiSLIP device name may be different depending on your VISA settings.

| | |
|-----------------------------|--|
| Key Path | System, I/O Config, SCPI LAN |
| Mode | All |
| Remote Command | :SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle? |
| Example | :SYST:COMM:LAN:SCPI:HISL:ENAB OFF |
| Preset | This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc” |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | A.11.00 |

SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. The user must use this command to obtain the port number of the control socket. To force a device clear on this socket, open the port and send the string “DCL” to the instrument.

If this SCPI command is sent to a non SCPI Socket interface, then 0 is returned.

| | |
|-----------------------------|--|
| Mode | All |
| Remote Command | :SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTrol? |
| Example | :SYST:COMM:LAN:SCPI:SOCK:CONT? |
| Preset | This is unaffected by Preset or “Restore System Defaults->Misc”. |
| State Saved | No |
| Range | 0 to 65534 |
| Min | 0 |
| Max | 65534 |
| Initial S/W Revision | Prior to A.02.00 |

System IDN Response

This key allows you to specify a response to the *IDN? query, or to return the analyzer to the Factory response if you have changed it.

To choose the factory-set response, press the **Factory** key.

To specify your own response, press the **User** key, and enter your desired response.

If your test software is expecting the response to indicate Agilent Technologies as the Manufacturer, you can conveniently configure the response by pressing the Agilent key.

| | |
|--------------------------|--|
| Key Path | System, I/O Config |
| Mode | All |
| Remote Command | |
| Notes | <ul style="list-style-type: none"> • This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode.. • It survives shutdown and restart of the software and therefore survives a power cycle |
| Preset | This is unaffected by Preset but is set to Factory on a "Restore System Defaults-> Misc" |
| State Saved | No |
| Initial S/W Revision | A.06.00 |
| Modified at S/W Revision | x.14.50 |

Factory

This key selects the factory setting, for example:

"Keysight Technologies,E6650A,MY00012345,E.14.50"

where the fields are manufacturer, model number, serial number, firmware revision.

| | |
|----------------------|---|
| Key Path | System, I/O Config, IDN Response |
| Example | :SYST:IDN:CONF FACT |
| Initial S/W Revision | A.06.0 |

User

This key allows you to specify your own response to the *IDN? query. You may enter your desired response with the Alpha Editor or a plugin PC keyboard.

When you press this key, the active function becomes the current User string with the cursor at the end. This makes it easy to edit the existing string.

If you enter a null string (for example, by clearing the User String while editing and then pressing **Done**) the analyzer automatically reverts to the Factory setting.

| | |
|----------------------|---|
| Key Path | System, I/O Config, IDN Response |
| Example | :SYSTem:IDN:CONF USER |
| Initial S/W Revision | A.06.00 |

SYSTem:IDN Response setting (Remote command)

This SCPI command is used to set or clear the User SYSTem:IDN response.

| | |
|-----------------------|--|
| Remote Command | :SYSTem:IDN <string> :SYSTem:IDN? |
| Notes | <ul style="list-style-type: none"> • The format of the <string> must be four fields each separated by a comma, example: :SYST:IDN "XYZ Corp,Model 12,012345,A.01.01" • The four fields are <manufacturer>, <model number>, <serial number>, <firmware revision>. Thus, the text within a field cannot contain a comma. • This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode.. • It survives shutdown and restart of the software and therefore survives a power cycle • Null string as parameter restores the Factory setting, example: :SYST:IDN "" |
| Preset | This is unaffected by Preset but is set to the original factory setting on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.06.00 |

Restore Defaults

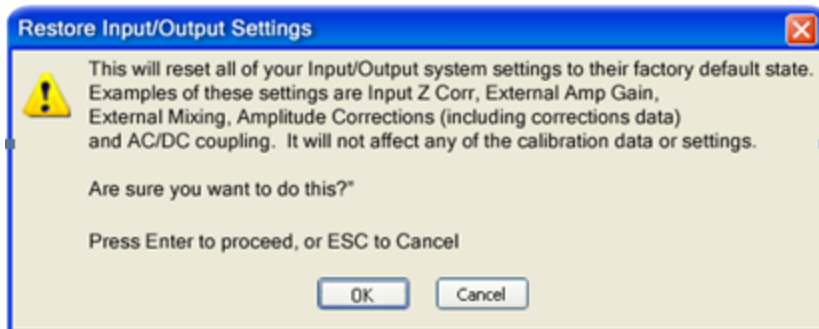
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values.

| | |
|-----------------------|--|
| Key Path | System |
| Mode | All |
| Remote Command | :SYSTem:DEFault [ALL] ALIGn INPut MISC MODes PON |
| Example | SYST:DEF |
| State Saved | No |
| Initial S/W Revision | Prior to A.02.00 |

Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. .

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:

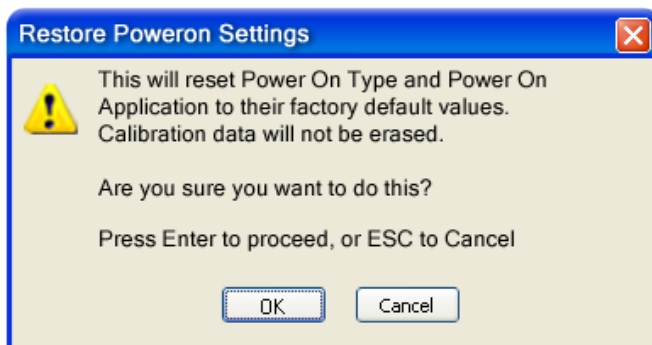


| | |
|----------------------|--|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF INP |
| Initial S/W Revision | Prior to A.02.00 |

Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



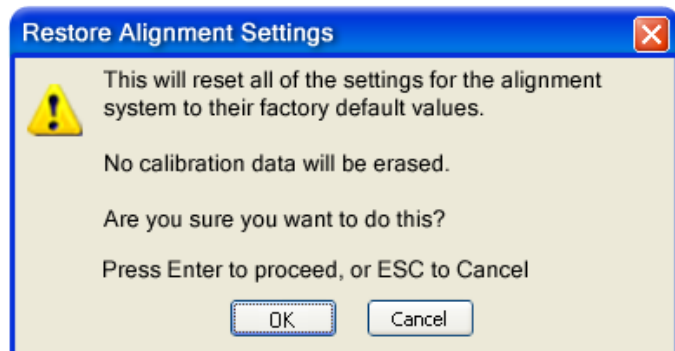
| | |
|----------------------|--|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF PON |
| Initial S/W Revision | Prior to A.02.00 |

Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

Confirmation is required to restore the factory default values. The confirmation dialog is:



| | |
|----------------------|--|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF ALIG |
| Initial S/W Revision | Prior to A.02.00 |

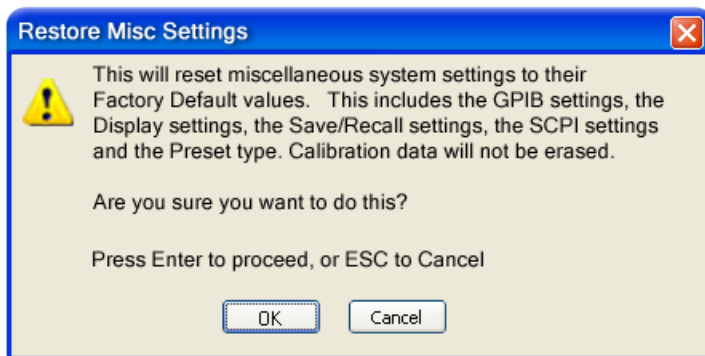
Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

| Miscellaneous Setting | Default Value |
|-----------------------|---------------|
| Verbose SCPI | Off |
| The SYST:PRES:TYPE | MODE |
| Auto File Name Number | 000 |
| Save Type | State |
| State Save To | Register 1 |
| Screen Save To | SCREEN000.png |
| DISP:ENABle | ON |
| Full Screen | Off |

| Miscellaneous Setting | Default Value |
|-------------------------------|-------------------------|
| SCPI Telnet | ON |
| SCPI Socket | ON |
| SICL Server | ON |
| Softkey Language | English |
| System Annotation | ON |
| Display Theme | TDColor |
| System IDN Response | Factory result of *IDN? |
| System IDN Response selection | Factory |
| | |
| | |
| | |

Confirmation is required to restore the factory default values. The confirmation dialog is:

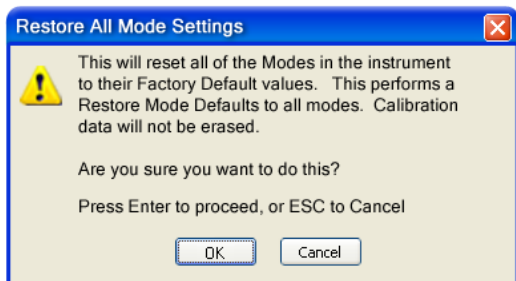


| | |
|--------------------------|--|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF MISC |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | x.14.50 |

Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

Confirmation is required to restore the factory default values. The confirmation dialog is:

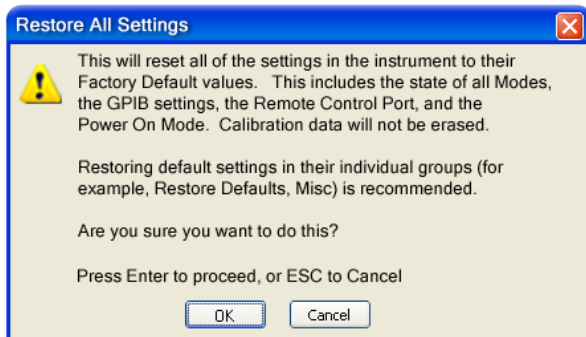


| | |
|----------------------|---|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF MOD |
| Couplings | An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode.. It gets the mode to a consistent state with all of the default couplings set. |
| Initial S/W Revision | Prior to A.02.00 |

All

This performs a comprehensive reset of ALL analyzer settings to their factory default values. It resets all of the system setting groups, causes a Restore Mode Defaults for all modes in the instrument, and switches back to the power-on mode. It does not affect the User Preset file or any user saved files.

Confirmation is required to restore the factory default values. The confirmation dialog is:



NOTE

If you are using an Keysight USB External Mixer, then you will need to perform a Refresh USB Mixer Connection after Restoring All Defaults.

| | |
|--------------------------|---|
| Key Path | System, Restore System Defaults |
| Example | :SYST:DEF ALL |
| Notes | If using Keysight USB External Mixer, perform a Refresh USB Mixer Connection (SCPI command :MIX:BAND USB) following a Restore All Defaults. |
| Couplings | An All will cause the currently running measurement to be aborted and get all modes to a consistent state, so it is unnecessary to couple any settings. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |

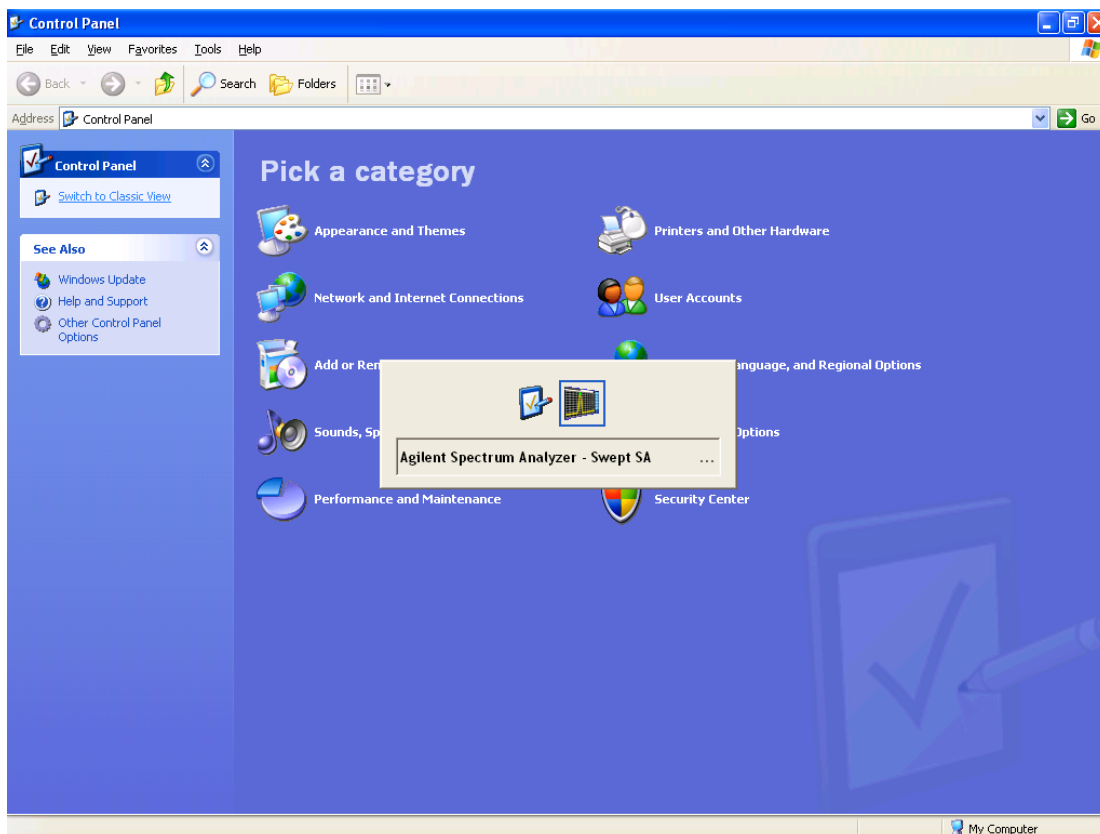
Control Panel...

Opens the Windows Control Panel. The Control Panel is used to configure certain elements of Windows that are not configured through the hardkey/softkey System menus.

NOTE This feature is not available if option SF1 is installed.

The Control Panel is a separate Windows application, so to return to the analyzer once you are in the Control Panel, you may either:

Exit the Control Panel by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

| Key Path | System |
|----------------------|---------------------------------|
| Notes | No remote command for this key. |
| Initial S/W Revision | Prior to A.02.00 |

Licensing...

Opens the license explorer.

NOTE This feature is not available if option SF1 is installed.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

| Key Path | System |
|-------------------------------|--|
| Notes | No equivalent remote command for this key. |
| Backwards Compatibility Notes | In ESA the SCPI command for displaying the Show Licenses screen is: :SYSTem:CONFigure:LKEY:STATe OFF ON 0 1:SYSTem:CONFig- ure:LKEY:STATe? There are no equivalent SCPI commands in the X-Series for displaying the License Explorer. |
| Initial S/W Revision | Prior to A.02.00 |

Remote Command :SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">

Example SYST:LKEY "N9073A-1FP",
"027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"

Notes The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature.
The <"LicenseInfo"> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports reverse compatibility.

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:LKEY:DELeTe <"OptionInfo">,<"LicenseInfo">

Example SYST:LKEY:DEL 'N9073A-1FP',
"027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"

Notes The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed.
The <"LicenseInfo"> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports reverse compatibility.

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:LKEY:LIST?

Notes

Return Value:

An <arbitrary block data> of all the installed instrument licenses.

The format of each license is as follows.

<Feature>,<Version>,<Signature>,<Expiration Date>,<Serial Number for Transport>

Return Value Example:

#3136

N9073A-1FP,1.000,B043920A51CA

N9060A-2FP,1.000,4D1D1164BE64

N9020A-508,1.000,389BC042F920

N9073A-1F1,1.000,5D71E9BA814C,13-aug-2005

<arbitrary block data> is:

#NMMM<data>

Where:

N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2.

MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55.

<data> ASCII contents of the data

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:LKEY? <"OptionInfo">

Example SYST:LKEY? "N9073A-1FP"

Notes

The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one.

Return Value:

<"LicenseInfo"> if the license is valid, null otherwise.

<"LicenseInfo"> contains the signature, the expiration date, and serial number if transportable.

Return Value Example:

"B043920A51CA"

Initial S/W Revision Prior to A.02.00

Remote Command :SYSTem:HID?

| | |
|----------------------|---|
| Notes | Return value is the host ID as a string |
| Initial S/W Revision | Prior to A.02.00 |

Security

Accesses capabilities for operating the instrument in a security controlled environment.

| | |
|----------------------|---------------|
| Key Path | System |
| Initial S/W Revision | A.04.00 |

USB

The Windows operating system can be configured to disable write access to the USB ports for users who are in a secure environment where transferring data from the instrument is prohibited. This user interface is a convenient way for the customer to disable write access to USB.

| | |
|-----------------------|---|
| Key Path | System, Security |
| Mode | All |
| Scope | Mode Global |
| Remote Command | :SYSTem:SECurity:USB:WPRotect[:ENABLE] ON OFF 0 1 :SYSTem:SECurity:USB:WPRotect[:ENABLE]? |
| Example | :SYST:SEC:USB:WPR ON Will set USB ports to Read-only |
| Notes | When the USB ports are in Read-only mode then no data can be stored to USB, including the internal USB memory used for a back-up location for the calibration data. |
| Dependencies | This key is grayed-out unless the current user has administrator privileges. |
| Preset | This is unaffected by Preset or any Restore System Defaults. An Agilent Recovery will set the USB to write protect OFF |
| State Saved | No |
| Range | Read-Write Read only |
| Initial S/W Revision | A.04.00 |

Read-Write

Selection for allowing full read-write access to the USB ports.

| | |
|----------------------|--|
| Key Path | System, Security, USB |
| Example | :SYST:SEC:USB:WPR OFF Will set USB ports to Read-Write |
| Initial S/W Revision | A.04.00 |

Read only

Selection for disabling write access to the USB ports.

| | | |
|----------------------|------------------------------|---------------------------------|
| Key Path | System, Security, USB | |
| Example | :SYST:SEC:USB:WPR ON | Will set USB ports to Read only |
| Initial S/W Revision | A.04.00 | |

Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

| | | |
|----------------------|------------------|--|
| Key Path | System | |
| Initial S/W Revision | Prior to A.02.00 | |

Show Hardware Statistics

Provides a display of various hardware statistics. The statistics include the following:

- High and Low temperature extremes
- Elapsed time that the instrument has been powered-on (odometer)

The display should appear listing the statistics, product number, serial number, and firmware revision.

| Hardware Statistical Information | |
|--------------------------------------|----------|
| Agilent MXA Signal Analyzer | |
| Product Number: N9020A | |
| Serial Number: US00061145 | |
| Instrument SW Revision: A.12.00 | |
| Revision Date: 7/11/2012 12:11:10 PM | |
| | |
| Component Name | Value |
| MechAtten #1 Count Total | 457304 |
| Calibrator Switch Cycles | 105953 |
| AC/DC Switch Cycles | 114240 |
| 2 dB #1 Mechanical Atten Cycles | 112655 |
| 2 dB #2 Mechanical Atten Cycles | 124456 |
| MechAtten #2 Count Total | 472265 |
| 6 dB Mechanical Atten Cycles | 115302 |
| 10 dB Mechanical Atten Cycles | 93602 |
| 20 dB Mechanical Atten Cycles | 144781 |
| 30 dB Mechanical Atten Cycles | 118580 |
| Low Noise Path Switch | 45668 |
| Preselector Bypass Cycles | 31133 |
| High temperature operating extreme | 45.75 |
| Low temperature operating extreme | -23.9375 |
| Elapsed Time (On-Time)(hours) | 134164 |

In some CXA models this field is called "Fixed Atten"

Some CXA models omit these fields

Only shown if LNP installed

Only shown if MPB installed

The CXA models in which the AC/DC Switch field is called Fixed Atten and that omit the mechanical attenuation fields are the N9000A-503/507 models.

Modular HWs only have time and temperature information in Show Hardware Statistics.

The data will be updated only when the Show Hardware Statistics menu key is pressed, it will not be updated while the screen is displayed.

The tabular data should be directly printable.

| Key Path | System, Diagnostics |
|----------------------|---|
| Mode | All |
| Notes | The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed. |
| Initial S/W Revision | Prior to A.02.00 |

SCPI for Show Hardware Statistics (Remote Commands Only)

Each of the hardware statistic items can be queried via SCPI.

- Error! Reference source not found.
- Error! Reference source not found.
- Error! Reference source not found.

Advanced

Accesses advanced diagnostic capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “saservice”.

NOTE This feature is not available if option SF1 is installed.

The first access to the Advanced Diagnostic Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Advanced Diagnostic Menu are unimpeded. The Authentication dialog looks like:

“OK” is the default key thus the Enter key is used to complete the entry. If invalid Service Code is entered authentication is not granted and you are provided the following dialog:

| | |
|----------------------|---|
| Key Path | System, Diagnostics |
| Notes | Password is required to access this menu. |
| Initial S/W Revision | Prior to A.02.00 |

Key Recorder

Access the Key Recorder feature. The full details to the Key Recorder are in the [Key Recorder How-to document](#).

| | |
|----------------------|--------------------------------------|
| Key Path | System, Diagnostics, Advanced |
| Initial S/W Revision | Prior to A.02.00 |

Key Recorder On/Off

See the [Key Recorder How-to document](#), listed here is the table information for LP/SEP use:

| | |
|----------------------|---|
| Key Path | System, Diagnostics, Advanced, Key Recorder |
| Mode | All |
| Notes | The startup of the key recorder is controlled by a registry entry, refer to the key recorder document listed above. |
| Preset | Not affected by Preset. |
| State Saved | No |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

Show Keystroke History...

Launches Notepad with the key recorder history file loaded. See the [Key Recorder How-to document](#), listed here is the table information for LP/SEP use:

| | |
|----------------------|--|
| Key Path | System, Diagnostics, Advanced, Key Recorder |
| Notes | Operator is responsible for exiting Notepad and returning focus to the Instrument Application. |
| Initial S/W Revision | Prior to A.02.00 |

Self test

This key gives you access to diagnostic capabilities for self tests of the instrument.

| | |
|----------------------|----------------------------|
| Key Path | System, Diagnostics |
| Initial S/W Revision | Prior to A.10.00 |

All Self Test

This key invokes all the self tests defined in the Diagnostics Self Test section.

| | |
|-----------------------|---------------------------------------|
| Key Path | System, Diagnostics, Self Test |
| Remote Command | SYSTem:TEST:WCTS:[ALL] |
| Example | SYST:TEST:WCTS:[ALL] |
| Initial S/W Revision | A.12.50 |

FEC Self Test

This key invokes the EXT E6607C front end control self test. When operation is complete, the generated test summary information is appended to log file E:\Agilent\Instrument\FECTestLog.txt. This test summary

file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\FECTestLog.txt”

If the self test passes, an advisory message “FEC self-test completed successfully” is generated.

| | |
|-----------------------------|---|
| Key Path | System, Diagnostics, Self Test |
| Remote Command | SYSTem:TEST:WCTS:FEC |
| Example | SYST:TEST:WCTS:FEC |
| Notes | Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\FECTestLog.txt" |
| Initial S/W Revision | A.12.50 |

Show Result

This key gives you access to show results of the following self tests:

- Source self-test results
- E6607C embedded MPA or E6640A/E6650A RFIO self-test results
- E6607C FEC self-test results

| | |
|-----------------------------|---------------------------------------|
| Key Path | System, Diagnostics, Self Test |
| Initial S/W Revision | A.12.50 |

FEC Self Test Results

Provides a display of last FEC test results, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each FEC test item, the tabular data should be directly printable.

| | |
|-----------------------------|--|
| Key Path | System, Diagnostics, Self Test,Show Results |
| Remote Command | SYSTem:TEST:WCTS:SHOW:RESult FEC |
| Example | SYST:TEST:WCTS:SHOW:RES FEC |
| Initial S/W Revision | A.12.50 |

The example of FEC self test result display is as follows:

```
FEC Self Test Results
Produce Number: E6607C
Serial Number: MY51380437
```

| Instrument S/W: 11/16/2012 2:51:19 PM | | | | | |
|---------------------------------------|-----------|------------------|-----------|-------------------|--------|
| FpgaVersionTest | | | | | |
| Date | Time(GMT) | Name | MeasValue | ValidRange | Result |
| 11/23/2012 | 16:13:56 | Analog_FPGA | 16.000 | >= 16.000 | Pass |
| 11/23/2012 | 16:13:56 | Digital_FPGA | 50.000 | >= 46.000 | Pass |
| 11/23/2012 | 16:13:56 | CRFS_FPGA | 38.000 | >= 38.000 | Pass |
| PowerSupplyTest | | | | | |
| Date | Time(GMT) | Name | MeasValue | ValidRange | Result |
| 11/23/2012 | 16:13:56 | ABUS_+32CHK | 31.904 | 30.900 - 32.900 | Pass |
| 11/23/2012 | 16:13:56 | ABUS_+12CHK | 12.296 | 10.800 - 13.200 | Pass |
| 11/23/2012 | 16:13:56 | +10VA | 9.935 | 9.600 - 10.200 | Pass |
| 11/23/2012 | 16:13:56 | +5VA | 4.995 | 4.900 - 5.100 | Pass |
| 11/23/2012 | 16:13:56 | +3.3VA | 3.299 | 3.200 - 3.400 | Pass |
| 11/23/2012 | 16:13:56 | -3.3VA | -3.311 | -3.400 - - 3.200 | Pass |
| 11/23/2012 | 16:13:56 | ACOM | 0.00 | -0.200 - 0.200 | Pass |
| 11/23/2012 | 16:13:56 | -5VA | -5.036 | -5.100 - - 4.900 | Pass |
| 11/23/2012 | 16:13:56 | -6.1VA | -5.880 | -6.200 - - 5.700 | Pass |
| 11/23/2012 | 16:13:56 | -10VA | -10.116 | -10.200 - - 9.800 | Pass |
| 11/23/2012 | 16:13:56 | ABUS_-2.5V_REF | -2.508 | -2.520 - - 2.470 | Pass |
| 11/23/2012 | 16:13:56 | ABUS_+2.5V_REF | 2.508 | 2.480 - 2.520 | Pass |
| 11/23/2012 | 16:13:56 | ABUS_-10VPALC | -10.047 | -10.200 - - 9.800 | Pass |
| 11/23/2012 | 16:13:57 | ABUS_DET_MOD_FLT | 18.000 | 7.800 - 100.000 | Pass |

Show FEC Self Test Results contents (Remote Command Only)

A remote command is available to obtain the contents of the Show FEC Self Test Results screen (the entire contents, not just the currently displayed page).

| | |
|-----------------------|------------------------------|
| Remote Command | SYSTem:TEST:WCTS:FEC:RESult? |
| Example | SYST:TEST:WCTS:FEC:RES? |

| | |
|----------------------|--|
| Notes | The output is an IEEE Block format of the Show FEC Self Test Results contents. Each line is separated with a new-line character. |
| Initial S/W Revision | A.12.50 |

| | Keysight Converged | PSA |
|-------------|--|--|
| IP Address | SYSTem:COMMunicate:LAN:ADDRes <string> SYSTem:COMMunicate:LAN:ADDRes? | :SYSTem:COMMunicate:LAN[:SELF]:IP <string> :SYSTem:COMMunicate:LAN[:SELF]:IP? |
| Gateway | SYSTem:COMMunicate:LAN:DGATeway <string> SYSTem:COMMunicate:LAN:DGATeway? | :SYSTem:COMMunicate:LAN[:SELF]:GATEWay <string> :SYSTem:COMMunicate:LAN[:SELF]:GATEWay? |
| Subnet Mask | SYSTem:COMMunicate:LAN:SMASk <string> SYSTem:COMMunicate:LAN:SMASk? | :SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask <string> :SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask? |

Internet Explorer...

This key launches Microsoft Internet Explorer. A mouse and external keyboard are highly desired for using Internet Explorer. When Internet Explorer is running, close Internet Explorer to return focus to the Instrument Application (or use Alt-Tab).

| | |
|----------------------|--|
| Key Path | System |
| Mode | All |
| Notes | No equivalent remote command for this key. |
| Initial S/W Revision | A.05.01 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

7 Trigger Functions

Trigger

Accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, and so forth.

The TRIG:SOURCe command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the TRIGger:RF:SOURce and TRIGger:IQ:SOURce commands (later in this section). When in External Mixing, the analyzer uses the RF trigger source.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See ["Trigger Source Presets" on page 335](#)

See ["RF Trigger Source" on page 338](#)

See ["I/Q Trigger Source" on page 339](#)

See ["More Information" on page 340](#)

| Key Path | Front-panel key |
|-----------------------|--|
| Remote Command | <pre>:TRIGger:<measurement>[:SEquence]:SOURce EXTernal1 EXTernal2 IMMediate LINE FRAMe RFBurst VIDeo IF ALARm LAN IQMag IDEMod QDEMod IINPut QINPut AIQMag TV :TRIGger:<measurement>[:SEquence]:SOURce?</pre> <p>where <measurement> is the measurement for which you wish to set the Source (blank for the Swept SA measurement)</p> |
| Example | <pre>TRIG:ACP:SOUR EXT1</pre> <p>Selects the external 1 trigger input for the ACP measurement and the selected input</p> <pre>TRIG:SOUR VID</pre> <p>Selects video triggering for the Swept SA (SANalyzer) measurement in the Spectrum Analyzer mode. For SAN, do not use the <measurement> keyword. Only send this form in the Spectrum Analyzer mode or you will get an Undefined Header error</p> |
| Notes | <p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. See the "RF Trigger Source" on page 338 and "I/Q Trigger Source" on page 339 commands for detailed information on which trigger sources are available for each input.</p> <p>Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems.</p> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges and presets can vary from mode to mode.</p> |
| Dependencies | <p>In some models, there is no second External input. In these models, the External 2 key is blanked and</p> |

| | |
|-------------------------------------|--|
| | the EXternal2 parameter will generate a "Hardware missing; Not available for this model number" message. |
| Preset | See table below |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:SOURCe EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | [:SENSe]:<measurement>:TRIGger:SOURce This backwards compatibility alias command is provided for ESA/PSA compatibility This backwards compatibility command does not apply to the Swept SA measurement, for that just use :TRIGger:SOURCe This backwards compatibility command does not apply to the monitor spectrum, log plot and spot frequency measurements |
| Backwards Compatibility SCPI | [:SENSe]:<measurement>:TRIGger:SOURce IF In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF parameter selects VIDeo triggering. Sending IF in the command causes VID to be returned to a query. |
| Backwards Compatibility SCPI | [:SENSe]:ACPr:TRIGger:SOURce This backwards Compatibility SCPI command is provided to support the same functionality as [:SENSe]:ACPr:TRIGger:SOURce (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to the fact that the ACPr node conflicts with the ACPower node. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

| Meas | Mode | Preset for RF | Preset for IQ | Notes |
|----------|--|-----------------------------|------------------|---|
| Swept SA | SA | IMM | IQ not supported | |
| CHP | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR | IMM | IQ not supported | |
| OBW | SA, WCDMA, C2K, WIMAX OFDMA, | 1xEVDO: EXT1 others: IMM | IQ not supported | For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate |

| | | | | |
|----------|---|---|--|--|
| | TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T, MSR | | | source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMEDIATE, VIDEO, LINE, FRAME or IF, the gate state is set to off. |
| CCDF | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR | WIMAX OFDMA: RFBurst LTETDD: BTS: External 1 MS: Periodic Timer TD-SCDMA and 1xEV-DO: BTS: External 1 MS: RFBurst SA, WCDMA, C2K, LTE, CMMB, ISDB-T, DVB-T/H, DTMB, Digital Cable TV, MSR: IMMEDIATE | TD-SCDMA and 1xEV-DO: BTS: External 1 MS: IQMag LTETDD: BTS: External 1 MS: Periodic Timer Others: IMM | For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTERNAL1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out. |
| ACP | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR | IMM | IQ not supported | |
| Tx Power | SA, GSM, TD-SCDMA | SA, GSM: RFBurst TD-SCDMA: EXTERNAL | IMM | TD-SCDMA doesn't support the Line and Periodic Timer parameters. When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst |
| SPUR | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, LTE, LTETDD, MSR | IMM | IQ not supported | |
| SEM | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB- | 1xEVDO(BTS): EXTERNAL1 All others: IMMEDIATE | IQ not supported | |

| | | | | |
|-----------|--|---|---|--|
| | T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR | | | |
| CDP | WCDMA | IMM | IMM | |
| RHO | WCDMA | IMM | IMM | |
| PCON | WCDMA | IMM | IMM | |
| QPSK | WCDMA, C2K, 1xEVDO | All except CDMA1xEVDO: IMMediate CDMA1xEVDO: EXT1 | IMM | |
| MON | All except SA and BASIC | IMM | IQ not supported | |
| WAV | | LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: RFBurst All others: IMMediate | LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: IQMag All others: IMMMediate | |
| PVT | WIMAXOFDMA | RFB | IMM | |
| EVM | WIMAXOFDMA, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV | All but CMMB: IMM CMMB: Periodic Timer | All but CMMB: IMM CMMB: External 1 | LTE, LTETDD supports Free Run, Video and External 1 only. |
| SPEC | BASIC | IMM | IMM | |
| LOG Plot | PN | IMM | IQ not supported | |
| Spot Freq | PN | IMM | IQ not supported | |
| GMSK PVT | EDGE/GSM | RFB | IMM | |
| GMSK PFER | EDGE/GSM | RFB | IQMag | |
| GMSK ORFS | EDGE/GSM | RF Burst | IQ not supported | |
| EDGE PVT | EDGE/GSM | RFB | IMM | |

| | | | |
|--------------------------------|------------------|--|--|
| EDGE EVM | EDGE/GSM | RFB | IQMag |
| EDGE ORFS | EDGE/GSM | Periodic Timer | IQ not supported |
| Combined WCDMA | WCDMA | IMM | IQ not supported |
| Combined GSM | EDGE/GSM | RFB | IQ not supported |
| List Power Step | WCDMA, EDGE/GSM | IMM | IQ not supported |
| Transmit On/Off Power | LTETDD | LTETDD: BTS: External 1 MS: Periodic Timer | LTETDD: BTS: External 1 MS: Periodic Timer |
| Transmit Analysis | BLUETOOTH | RFB | IQ not supported |
| Adjacent Channel Power | BLUETOOTH | IMM | IQ not supported |
| LE In-band Emissions | BLUETOOTH | IMM | IQ not supported |
| EDR In-band Spurious Emissions | BLUETOOTH | Periodic Timer | IQ not supported |
| Conformance EVM | LTE, LTETDD, MSR | IMM | IMM |

RF Trigger Source

The **RF Trigger Source** command selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

| | |
|-----------------------|--|
| Remote Command | <code>:TRIGger:<measurement>[:SEquence]:RF:SOURce EXTernal1 EXTernal2 IMMEDIATE LINE FRAME RFBurst VIDEO IF ALARm LAN TV</code> <code>:TRIGger:<measurement>[:SEquence]:RF:SOURce?</code> |
|-----------------------|--|

| | |
|----------------|---|
| Example | <code>TRIG:ACP:RF:SOUR EXT1</code> Selects the external 1 trigger input for the ACP measurement and the RF input |
|----------------|---|

| | |
|------------------------------|--|
| | <p>TRIG:RF:SOUR VID</p> <p>Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.</p> |
| Notes | <p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the RF Trigger Source, the following trigger sources are available:</p> <ul style="list-style-type: none"> –IMMediate - free run triggering –VIDeo - triggers on the video signal level –LINE - triggers on the power line signal –EXTernal1 (or EXTernal) - triggers on an externally connected trigger source marked “Trigger 1 In” on the rear panel –EXTernal2 - triggers on an externally connected trigger source marked “Trigger 2 In” on the front panel. In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message –RFBurst - triggers on the bursted frame –FRAMe - triggers on the periodic timer –IF (video) - same as video, for backwards compatibility only <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and presets can vary from mode to mode.</p> |
| Status Bits/OPC dependencies | <p>The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.</p> |
| Initial S/W Revision | Prior to A.02.00 |

I/Q Trigger Source

This command selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

| | |
|-----------------------|--|
| Remote Command | <pre>:TRIGger:<measurement>[:SEquence]:IQ:SOURce EXTernal1 EXTernal2 IMMediate IQMag IDEMod QDEMod IINPut QINPut AIQMag :TRIGger:<measurement>[:SEquence]:IQ:SOURce?</pre> |
| Example | <p>TRIG:WAVeform:SOUR IQM</p> <p>Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input</p> |
| Notes | <p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the I/Q Trigger Source, the following trigger sources are available:</p> |

| | |
|------------------------------|--|
| | <ul style="list-style-type: none"> –IMMediate - free run triggering –EXternal1 (or EXternal) - triggers on an externally connected trigger source on the rear panel –EXternal2 - triggers on an externally connected trigger source on the front panel –IQMag - triggers on the magnitude of the I/Q signal –IDEMod - triggers on the I/Q signal's demodulated I voltage –QDEMod - triggers on the I/Q signal's demodulated Q voltage –IINPut - triggers on the I channel's ADC voltage –QINPut - triggers on the Q channel's ADC voltage –AIQMag - triggers on the magnitude of the auxiliary receiver channel I/Q signal <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and from mode to mode presets can vary</p> |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and –10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

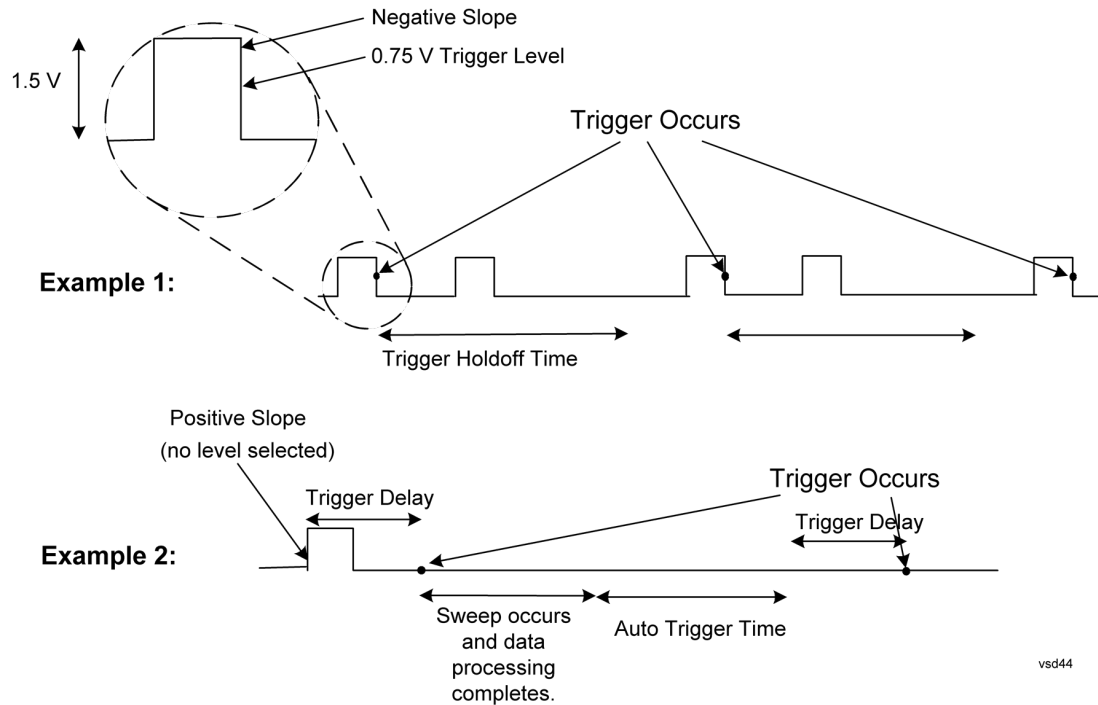
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR IMM Swept SA measurement TRIG:<meas>:SOUR IMM Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

| Key Path | Trigger |
|-------------------------------|--|
| Example | TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA |
| Notes | Log Plot and Spot Frequency measurements do not support Video Trigger |
| Dependencies | Video trigger is allowed in average detector mode. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

| Key Path | Trigger, Video |
|-----------------------|---|
| Remote Command | :TRIGger[:SEquence]:VIDeo:LEVel <ampl> :TRIGger[:SEquence]:VIDeo:LEVel? |
| Example | TRIG:VID:LEV -40 dBm |
| Notes | When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have |

given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level.

Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.

| | |
|-------------------------------------|--|
| Couplings | This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu. |
| Preset | Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. |
| State Saved | Saved in instrument state |
| Min | -170 dBm |
| Max | +30 dBm |
| Default Unit | Depends on the current selected Y axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:LEVel :TRIGger[:SEquence]:IF:LEVel? |
| Backwards Compatibility Notes | This alias is provided for backward compatibility with VSA/PSA comms apps. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEquence]:VIDeo:SLOPe? |
| Example | TRIG:VID:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:SLOPe NEGative POSitive :TRIGger[:SEquence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|--------------------------------------|---|
| Remote Command | :TRIGger[:SEquence]:SLOPe POSitive NEGative :TRIGger[:SEquence]:SLOPe? |
| Example | TRIG:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Delay

Controls a time delay during that the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in the time domain or FFT, but not in swept spans.

| | |
|--------------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:DELaY <time> :TRIGger[:SEquence]:VIDeo:DELaY? :TRIGger[:SEquence]:VIDeo:DELaY:STATe OFF ON 0 1 :TRIGger[:SEquence]:VIDeo:DELaY:STATe? |
| Example | TRIG:VID:DEL:STAT ON TRIG:VID:DEL 100 ms |
| Notes | Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set. |
| Preset | Off, 1 us |
| State Saved | Saved in instrument state |
| Min | -150 ms |
| Max | +500 ms |
| Default Unit | s |
| Backwards Compatibility Notes | ! For backward compatibility with VSA/PSA comms apps :TRIGger[:SEquence]:IF:DELaY :TRIGger[:SEquence]:DELaY The legacy :TRIGger[:SEquence]:DELaY command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|--------------------------------------|--|
| Remote Command | :TRIGger[:SEquence]:DELay <time> :TRIGger[:SEquence]:DELay? :TRIGger[:SEquence]:DELay:STATE OFF ON 0 1 :TRIGger[:SEquence]:DELay:STATE? |
| Example | TRIG:DEL 1 ms |
| Preset | 1 us |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | In ESA/PSA, the Trigger Delay was global to all triggers. In the X-Series, the delay can be set individually for each Trigger Source. For backward compatibility, the global DELay command updates all instances of trigger slope (VID, LINE, EXT1, EXT2) except TV and RFBurst. The query returns the trigger delay setting of the currently selected trigger source. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------------|---|
| Remote Command | :TRIGger[:SEquence]:OFFSet <time> :TRIGger[:SEquence]:OFFSet? :TRIGger[:SEquence]:OFFSet:STATE OFF ON 0 1 :TRIGger[:SEquence]:OFFSet:STATE? |
| Example | TRIG:OFFS ON TRIG:OFFS -100 ms |
| Notes | These are ESA commands for trigger offset that allowed you to use a positive or negative delay when in zero span and in a Res BW \geq 1 kHz. For ESA compatibility, X-series analyzers keep track of this offset and adds it to the Trigger Delay for VIDEo, LINE, EXTernal1 or EXTernal2 whenever the value is sent to the hardware, if in Zero Span and RBW \geq 1 kHz. |
| Preset | Off, 0 s |
| State Saved | Saved in instrument state |
| Min | -11 s |
| Max | +11 s |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|-----------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |

| | |
|------------------------------|--|
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative |

| | |
|-------------------------------------|--|
| | :TRIGger[:SEQuence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEQuence]:EXTernal1:DELAy <time> :TRIGger[:SEQuence]:EXTernal1:DELAy? :TRIGger[:SEQuence]:EXTernal1:DELAy:STATe OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal1:DELAy:STATe? |
| Example | TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms |
| Notes | Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set. |
| Preset | Off, 1.000 us |
| State Saved | Saved in instrument state |
| Min | -150 ms |
| Max | +500 ms |
| Default Unit | s |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:EXTernal:DELAy For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility | The legacy :TRIGger[:SEQuence]:DELAy command affects the delay for the VID, LINE, EXT1, EXT2, |

| | |
|----------------------|---|
| Notes | and RFB triggers. The legacy :TRIGger[:SEQuence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|----------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation? |
| Example | TRIG:EXT1:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| | |
|--------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |

| | |
|------------------------------|--|
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |

| | |
|-------------------------------------|--|
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

| | |
|-------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEQuence]:EXTernal2:DELay <time> :TRIGger[:SEQuence]:EXTernal2:DELay? :TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal2:DELay:STATe? |
| Example | TRIG:EXT2:DEL:STAT ON TRIG:EXT2:DEL 100 ms |
| Notes | Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set. |
| Preset | Off, 1.000 us |
| State Saved | Saved in instrument state |
| Min | -150 ms |
| Max | 500 ms |
| Default Unit | s |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. The legacy :TRIGger[:SEQuence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed

from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|-----------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:DELay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DELay:COMPensation? |
| Example | TRIG:EXT2:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| | |
|--------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| | |
|-------------------------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:
3. absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level
4. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEquence]:RFBurst:LEVel:RELative? |
| Example | TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB |
| Notes | Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent. |
| Dependencies | This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering. |
| Preset | -6 dB GSM: -25 dB |
| State Saved | Saved in instrument state |
| Min | -45 dB |

| | |
|-------------------------------------|--|
| Max | 0 dB |
| Default Unit | dB or dBc |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:RFBurst:LEVel This legacy command is aliased to :TRIGger[:SEquence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

| | |
|-----------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:DELay <time> :TRIGger[:SEquence]:RFBurst:DELay? :TRIGger[:SEquence]:RFBurst:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:RFBurst:DELay:STATe? |
| Example | TRIG:RFB:DEL:STAT ON TRIG:RFB:DEL 100 ms |

| | |
|-------------------------------|---|
| Notes | Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set. |
| Preset | Off, 1.000 us |
| State Saved | Saved in instrument state |
| Min | -150 ms |
| Max | 500 ms |
| Default Unit | s |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Readback | [Sync: <value of Sync Source>], for example, [Sync: External 1] |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

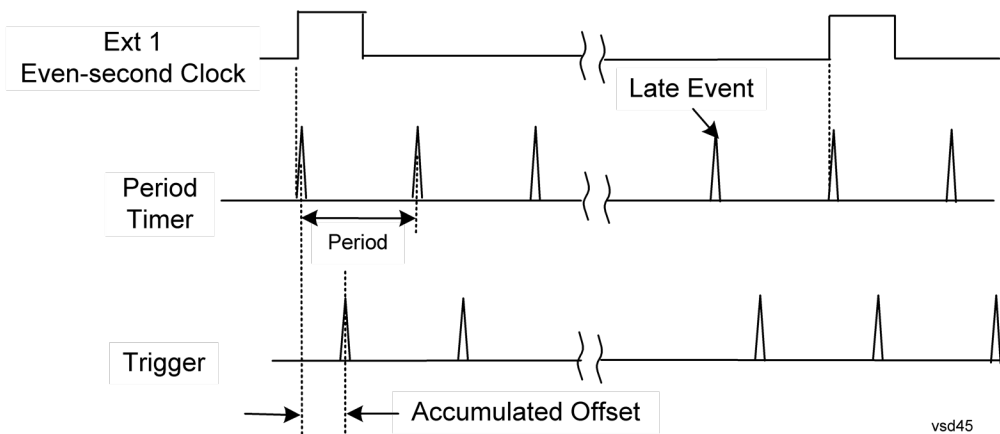
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not miss-trigger. Miss-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

| | |
|-----------------------------|---|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:PERiod <time> :TRIGger[:SEquence]:FRAMe:PERiod? |
| Example | TRIG:FRAM:PER 100 ms |
| Dependencies | The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes. |
| Couplings | The same period is used in the Gate Source selection of the period timer. |
| Preset | 20 ms GSM: 4.615383 |
| State Saved | Saved in instrument state |
| Min | 100.000 ns |
| Max | 559.0000 ms |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

| | |
|-----------------------|---|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet <time> :TRIGger[:SEquence]:FRAMe:OFFSet? |
| Example | TRIG:FRAM:OFFS 1.2 ms |
| Notes | The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key). |

| | |
|----------------------|---|
| | <p>Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365.</p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.</p> |
| Notes | <p>When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value.</p> <p>The SCPI query simply returns the value currently showing on the key.</p> |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

| | |
|----------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet |
| Example | TRIG:FRAM:OFFS:DISP:RES |
| Initial S/W Revision | Prior to A.02.00 |

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

| | |
|-------------------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal1 EXTernal2 RFBurst OFF :TRIGger[:SEquence]:FRAMe:SYNC? |
| Example | TRIG:FRAM:SYNC EXT2 |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message. |
| Preset | Off GSM/EDGE, MSR,LTE,LTETDD: RFBurst |
| State Saved | Saved in instrument state |
| Readback | The current setting is read back to this key and it is also Readback to the previous Periodic Timer trigger key. |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

| | |
|----------------------|---|
| Key Path | Trigger, Periodic Timer, Sync Source |
| Example | TRIG:FRAM:SYNC OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|--------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |

| | |
|------------------------------|--|
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:LEVel <level> :TRIGger[:SEquence]:EXTernal:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the |

| | |
|-------------------------------------|--|
| | period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:EXTernal:SLOPe |
| | For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| Key Path | Trigger |
|-------------------------------|--|
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| Key Path | Trigger, RF Burst |
|-----------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the |

| | |
|-------------------------------------|--|
| | RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|--------------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

| Key Path | Trigger, Periodic Timer |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:DELay <time> :TRIGger[:SEquence]:FRAMe:DELay? :TRIGger[:SEquence]:FRAMe:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:FRAMe:DELay:STATe? |
| Notes | Note that delay is used when the sync source is not set to OFF. If the sync source is set to OFF, offset is used. |
| Preset | Off, 1.000 us |
| State Saved | Saved in instrument state |
| Min | -150 ms |
| Max | +500 ms |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

| Key Path | Trigger |
|----------------------|--|
| Readback line | Displays a summary of the Auto Trig and Holdoff settings, in square brackets First line: Auto Off or Auto On Second Line: "Hldf" followed by: <ul style="list-style-type: none"> • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal |
| Initial S/W Revision | A.02.00 |

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

| | |
|-----------------------------|---|
| Key Path | Trigger, Auto/Holdoff |
| Remote Command | :TRIGger[:SEquence]:ATRigger <time> :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe? |
| Example | TRIG:ATR:STAT ON TRIG:ATR 100 ms |
| Notes | The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 1 ms |
| Max | 100 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

| | |
|-----------------------------|--|
| Key Path | Trigger, Auto/Holdoff |
| Remote Command | :TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATe? |
| Example | TRIG:HOLD:STAT ON TRIG:HOLD 100 ms |
| Dependencies | Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 0 s |
| Max | 0.5 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Holdoff Type

Lets you set the Trigger Holdoff Type.

NOTE

Holdoff Type is not supported by all measurements. If the current measurement does not support it, this key will be blank and the Holdoff Type will be Normal. If the Holdoff Type SCPI is sent while in such a measurement, the SCPI will be accepted and the setting remembered, but it will have no effect until a measurement is in force that supports Holdoff Type.

Trigger Holdoff Type functionality:

- NORMAl
- This is the “oscilloscope” type of trigger holdoff, and is the setting when the Holdoff Type key does not appear. In this type of holdoff, no new trigger will be accepted until the holdoff interval has expired after the previous trigger.
- ABOVe
- If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) and then remains above the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) after having been above the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.
- BELow
- If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) after having been below the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) and then remains below the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

| | |
|----------------------|--|
| Key Path | Trigger, Auto/Holdoff |
| Remote Command | :TRIGger[:SEquence]:HOLDoff:TYPE NORMAl ABOVe BELow :TRIGger[:SEquence]:HOLDoff:TYPE? |
| Example | TRIG:HOLD:TYPE NORM |
| Preset | All modes but GSM/EDGE: Normal GSM/EDGE: Below WLAN: Below |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.02.00 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

8 Channel Power Measurement

The Channel Power measurement is used to find the total power present in a specified bandwidth. The power spectral density (the power in the signal normalized to 1 Hz) is also reported (In WLAN mode or WLAN radio standard in SA mode, the peak power spectral density for 1 MHz is reported). For measurement results and views, see ["View/Display" on page 656](#).

This topic contains the following sections:

["Measurement Commands for Channel Power" on page 370](#)

["Remote CommandResults for Channel Power Measurement" on page 371](#)

Measurement Commands for Channel Power

These commands are used to measure the total rms power in a specified integration bandwidth.

Use :INSTrument:SElect to set the mode.

```
:CONFigure:CHPower
:CONFigure:CHPower:NDEFault
:INITiate:CHPower
:FETCh:CHPower[n]?
:MEASure:CHPower[n]?
:READ:CHPower[n]?
:FETCh:CHPower:CHPower?
:MEASure:CHPower:CHPower?
:READ:CHPower:CHPower?
:FETCh:CHPower:DENSity?
:MEASure:CHPower:DENSity?
:READ:CHPower:DENSity
```

For more measurement related commands, see the SENSE subsystem, and the section "[Remote Measurement Functions](#)" on page 2430.

Remote CommandResults for Channel Power Measurement

For WLAN, see [Error! Reference source not found.](#)

| Command | Return Value |
|--------------------------|---|
| FETCh:CHPower[n]? | Refer to the table below. |
| MEASure:CHPower[n]? | |
| READ:CHPower[n]? | |
| FETCh:CHPower:CHPower? | Returns the Channel Power (dBm) (BW compatibility functionality) |
| MEASure:CHPower:CHPower? | |
| READ:CHPower:CHPower? | |
| FETCh:CHPower:DENSity? | Returns the Power Spectral Density (dBm/Hz) (BW compatibility functionality) |
| MEASure:CHPower:DENSity? | |
| READ:CHPower:DENSity? | |

| n | Results Returned |
|------------------------|---|
| n=1 (or not specified) | Returns scalar results: <ol style="list-style-type: none"> 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power in the specified unit bandwidth. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz. |
| 2 | Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key. |

Remote Command Results for WLAN Channel Power Measurement

| n | Results Returned |
|------------------------|---|
| n=1 (or not specified) | <p>Returns scalar results:</p> <p>When the radio standard is NOT WLAN 802.11ac 80 + 80 MHz:</p> <ol style="list-style-type: none"> 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power in the specified unit bandwidth. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz. <p>When the radio standard is WLAN 802.11ac 80 + 80 MHz:</p> <ol style="list-style-type: none"> 1. Channel Power of the carrier of which the center frequency is indicated by Freq Segment 1 is a floating point number representing the total channel power of the first segment in the specified integration bandwidth. 2. PSD (Power Spectral Density) of the carrier of which the center frequency is indicated by Freq Segment 1 is the power in the specified unit bandwidth of the first segment. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz. 3. Channel Power of the carrier of which the center frequency is indicated by Freq Segment 2 is a floating point number representing the total channel power of the second segment in the specified integration bandwidth. 4. PSD (Power Spectral Density) of the carrier of which the center frequency is indicated by Freq Segment 2 is the power in the specified unit bandwidth of the second segment. The unit bandwidth is selected by the PSD Unit parameter in either dBm/Hz or dBm/MHz. |
| 2 | Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key. |

| Key Path | Meas |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent, except all Attenuation values and the Internal Preamp selection, which are the same across all measurements.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:CHP:VIEW:WIND:TRAC:Y:RLEV 10 dBm DISP:CHP:VIEW:WIND:TRAC:Y:RLEV? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTD mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dBm |
| State Saved | Saved in instrument state. |
| Min | -250.00 dBm |
| Max | 250.00 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Range

The Range menu allows setting amplitude controls of the instrument.

| | |
|----------------------|----------------------|
| Key Path | AMPTD Y Scale |
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|-----------------------------|---|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|---------------------------------|--|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|-----------------|-----------------------------------|
| Key Path | AMPTD Y Scale, Attenuation |
|-----------------|-----------------------------------|

| | |
|--------------------------|---|
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation OFF ON ELEctrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation ?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|-----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio ?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|-----------------|-----------------------------|
| Key Path | AMPTD Y Scale, Range |
|-----------------|-----------------------------|

| | |
|-----------------------------|--|
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet?</code> |
| Example | <code>POW:RANG:MIX:OFFS -5 dB</code> |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div

Sets the units per division of the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

| | |
|---------------------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_amp1></code> <code>:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?</code> |
| Example | <code>DISP:CHP:VIEW:WIND:TRAC:Y:PDIV 2</code> <code>DISP:CHP:VIEW:WIND:TRAC:Y:PDIV?</code> |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use <code>:INSTrument:SElect</code> to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dB |
| State Saved | Saved in instrument state. |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Ref Position

Positions the reference level at the top, center, or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

| Key Path | AMPTD Y Scale |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTER BOTTom :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | DISP:CHP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:CHP:VIEW:WIND:TRAC:Y:RPOS? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Auto Scaling

Toggles the Auto Scaling function between On and Off.

| Key Path | AMPTD Y Scale |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | DISP:CHP:VIEW:WIND:TRAC:Y:COUP OFF DISP:CHP:VIEW:WIND:TRAC:Y:COUP? |
| Couplings | When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically sets the scale per division to 10 dB and determines the reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | 1 |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 378

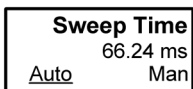
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPLe ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPLe ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

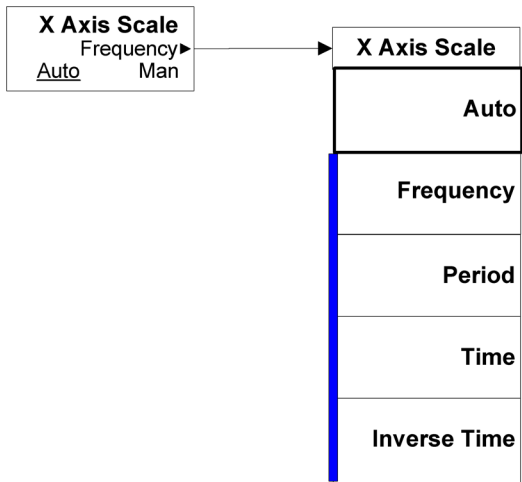
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



vsd08

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Res BW

Sets the value of the resolution bandwidth (RBW). If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

LTE-Advanced FDD/TDD Auto RBW:

| Bandwidth | RBW (KHz) |
|-----------|-----------|
| 1.4MHz | 20 |
| 3MHz | 43 |
| 5MHz | 68 |
| 10MHz | 150 |
| 15MHz | 220 |
| 20MHz | 270 |

the resolution bandwidth is predefined based on the corresponding bandwidth of the single LTE carrier, which is listed above. When ResBW mode is Auto, the narrowest RBW over the active carriers is selected for Multi-carriers.

| Key Path | BW |
|-----------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:CHPower:BANDwidth[:RESolution] <bandwidth> [:SENSe]:CHPower:BANDwidth[:RESolution]? [:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO ON OFF 1 0 [:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO? |
| Example | CHP:BAND 5 MHz CHP:BAND? CHP:BAND:AUTO ON CHP:BAND:AUTO? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |

| | |
|-------------------------------------|---|
| Couplings | <p>Sweep time is coupled to the RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration.</p> <p>Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1).</p> <p>When the Res BW is set to Auto, the resolution bandwidth is auto-coupled to the span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, and the bandwidths are entered manually, these bandwidths are used regardless of other analyzer settings.</p> |
| Preset | <p>SA: Auto</p> <p>WCDMA: 240 kHz</p> <p>C2K: 24 kHz</p> <p>WIMAX OFDMA: 100kHz</p> <p>1xEVDO: 30kHz</p> <p>DVB-T/H: 3.9kHz</p> <p>DTMB (CTTB): 3.9kHz</p> <p>ISDB-T: 30kHz</p> <p>CMMB: 3.9kHz</p> <p>LTE: Auto</p> <p>LTETDD: Auto</p> <p>Digital Cable TV: 3.9kHz</p> <p>WLAN: 100 kHz</p> <p>MSR: 100kHz</p> <p>LTEAFDD/LTEATDD: Auto</p> <p>WCDMA, C2K, 1xEVDO, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV, WLAN, MSR: OFF</p> <p>SA, LTE, LTETDD, LTEAFDD, LTEATDD: ON</p> |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 8 MHz |
| Backwards Compatibility SCPI | [:SENSe] :CHPower:BWIDth[:RESolution] |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Video BW

Changes the analyzer post-detection filter (VBW).

| | |
|----------------|---|
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:BA N Dwidth:VIDeo <bandwidth> |

| | |
|---------------------|---|
| | <pre>[:SENSe] :CHPower:BAWdwidth:VIDeo? [:SENSe] :CHPower:BAWdwidth:VIDeo:AUTO ON OFF 1 0 [:SENSe] :CHPower:BAWdwidth:VIDeo:AUTO?</pre> |
| Example | <pre>CHP:BAWd:VID 2.4 MHz CHP:BAWd:VID? CHP:BAWd:VID:AUTO OFF CHP:BAWd:VID:AUTO?</pre> |
| Notes | <p>You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode.</p> |
| Dependencies | See Couplings |
| Couplings | <p>Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW.</p> <p>Sweep Time is coupled to the Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually “in-circuit” when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result.</p> <p>Although the VBW filter is not “in-circuit” when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace.</p> <p>When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out).</p> <p>When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio</p> |
| Preset | <pre>SA: Auto WCDMA: 2.4MHz C2K: 240 kHz WIMAX OFDMA: Auto 1xEVDO: 300 kHz DVB-T/H: 39kHz DTMB (CTTB): 39kHz ISDB-T: 300kHz CMMB: 39kHz LTE, MSR: Auto LTETDD: Auto LTEAFDD,LTEATDD:Auto Digital Cable TV: 39kHz WLAN: Auto ON</pre> |

| | |
|--------------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 50 MHz |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Filter Type

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

| | |
|-------------------------------------|--|
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower :BANDwidth :SHAPE GAUSSian FLATtop [:SENSe] :CHPower :BANDwidth :SHAPE? |
| Example | CHP:BAND:SHAP GAUS CHP:BAND:SHAP? |
| Preset | GAUSSian |
| State Saved | Saved in instrument state. |
| Range | Gaussian Flattop |
| Backwards Compatibility SCPI | [:SENSe] :CHPower :BWIDth :SHAPE |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

8 Channel Power Measurement
File

File

See ["File" on page 272](#)

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements – it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 390](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 392](#)

See ["Center Frequency Presets" on page 388](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See " Center Frequency Presets " on page 388 and " RF Center Freq " on page 390 and Ext Mix Center Freq and " I/Q Center Freq " on page 392. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See " Center Frequency Presets " on page 388 and " RF Center Freq " on page 390 and " I/Q Center Freq " on page 392. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See " Center Frequency Presets " on page 388 and " RF Center Freq " on page 390 and " I/Q Center Freq " on page 392. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code> |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|---|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band - 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|----------------|--|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP[:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | <p>FREQ:CENT:STEP:AUTO ON</p> <p>FREQ:CENT:STEP 500 MHz</p> <p>FREQ:CENT UP increases the current center frequency value by 500 MHz</p> <p>FREQ:CENT:STEP?</p> <p>FREQ:CENT:STEP:AUTO?</p> |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | <p>Span, RBW, Center frequency</p> <p>If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning.</p> |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | <p>Auto</p> <p>ADEM0D: 1 MHz</p> <p>ON</p> |
| State Saved | Saved in instrument state |
| Min | – (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

8 Channel Power Measurement
Input/Output

Input/Output

See "[Input/Output](#)" on page 162

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

| | |
|----------------|--|
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:MODE Position DELTa OFF :CALCulate:CHPower:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:CHP:MARK3:MODE POS CALC:CHP:MARK3:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta Off |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Properties

Accesses the marker properties menu.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Relative To

Sets the reference marker to which the selected marker is relative.

| | |
|--------------------------|--|
| Key Path | Marker, Properties |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:CHPower:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:CHP:MARK:REF 5 CALC:CHP:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried, a single value is returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis or WCDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 12 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

All Markers Off

Turns off all markers.

| Key Path | Marker |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer:AOff |
| Example | CALC:CHP:MARK:AOff |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal**, **Delta**, or **Fixed**.

| | |
|--------------------------|--|
| Mode | SA, WCDMA, CDMA2K, WIMAXOFDMA, CDMA1XEV, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:X <real> :CALCulate:CHPower:MARKer[1] 2 ... 12:X? |
| Example | CALC:CHP:MARK3:X 0 CALC:CHP:MARK3:X? |
| Notes | The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency . |
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | Saved in instrument state. |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Marker X Axis Position (Remote Command Only)

Sets the marker X Axis Scale position in trace points. This setting has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

| | |
|------|---|
| Mode | SA, WCDMA, CDMA2K, WIMAXOFDMA, CDMA1XEV, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
|------|---|

| | |
|---------------------------------|--|
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:X:POSition <real> :CALCulate:CHPower:MARKer[1] 2 ... 12:X:POSition? |
| Example | CALC:CHP:MARK10:X:POS 0 CALC:CHP:MARK10:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . |
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | Saved in instrument state. |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Marker Y Axis Value (Remote Command only)

Returns the marker Y Axis value in the current marker Y Axis unit.

| | |
|---------------------------------|---|
| Mode | SA, WCDMA, CDMA2K, WIMAXOFDMA, CDMA1XEV, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:Y? |
| Example | CALC:CHP:MARK11:Y? |
| Preset | Result dependent on Markers setup and signal source. |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

| | |
|-----------------------|---|
| Mode | SA, WCDMA, CDMA2K, WIMAXOFDMA, CDMA1XEV, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:STATe OFF ON 0 1 :CALCulate:CHPower:MARKer[1] 2 ... 12:STATe? |
| Example | CALC:CHP:MARK3:STAT ON CALC:CHP:MARK3:STAT? |
| Preset | OFF |

| | |
|--------------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Marker Function

There are no 'Marker Functions' supported in Channel Power, so this front-panel key displays a blank menu when pressed.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Marker To

There is no 'Marker To' functionality supported in Channel Power measurement, so this front-panel key displays a blank key menu when pressed.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 2431](#)

["Current Measurement Query \(Remote Command Only\)" on page 2433](#)

["Limit Test Current Results \(Remote Command Only\)" on page 2433](#)

["Data Query \(Remote Command Only\)" on page 2433](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 2434](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 2439](#)

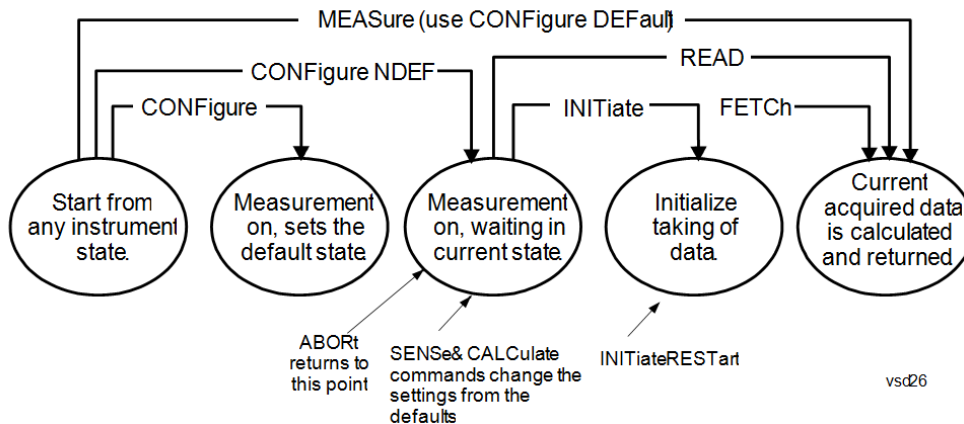
["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 2440](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 2454](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 2455](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

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| Initial S/W Revision | Prior to A.02.00 |
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Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

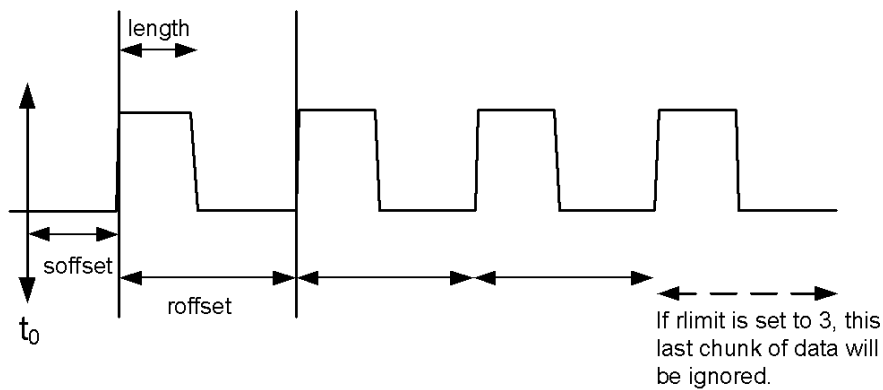
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

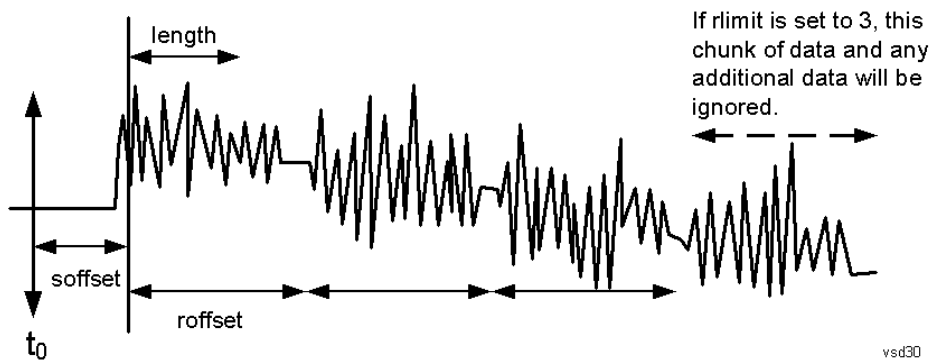
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|---|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLline LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
|-----------------------|---|

| | |
|----------------|---|
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
|----------------|---|

| | |
|--------------|---|
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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| Initial S/W Revision | Prior to A.02.00 |
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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|-------------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

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-----
E :CALC:FPOW:POW1:DEF?

```

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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

```

t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,
TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMAl order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMAl SWAPped :FORMat:BORDER? |
| Preset | NORMAl |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Displays the setup menu for the currently selected measurement. The parameters included in this menu are as follows.

Averaging

IF Gain

Channel Power Span

Integrated Bandwidth

Filter Bandwidth

Root Raised Cosine (RRC) Filter

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Avg/Hold Num

Specifies the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:CHPower:AVERage:COUNT <integer> [:SENSe]:CHPower:AVERage:COUNT? [:SENSe]:CHPower:AVERage[:STATe] ON OFF 1 0 [:SENSe]:CHPower:AVERage[:STATe]? |
| Example | CHP:AVER:COUN 15 CHP:AVER:COUN? CHP:AVER ON CHP:AVER? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | SA: 10 WCDMA: 200 WIMAX OFDMA, LTE, LTETDD, MSR: 200 CDMA2K: 20 1xEVDO: 20 |

| | |
|--------------------------|--|
| | DVB-T/H: 20 DTMB (CTTB): 20 ISDB-T: 10 CMMB: 10 Digital Cable TV: 10 WLAN: 10 LTEAFDD, LTEATDD:200 ON |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Avg Mode

Allows you to select the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each exponentially-weighted averaged value. The average is displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

| Key Path | Meas Setup |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:AVERage:TCONtrol EXPonential REPeat [:SENSe] :CHPower:AVERage:TCONtrol? |
| Example | CHP:AVER:TCON EXP CHP:AVER:TCON? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Preset | EXP |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Integ BW

Specifies the range of integration used in calculating the power in the channel. The integration bandwidth (IBW) is displayed on the trace as two markers connected by an arrow.

| Key Path | Meas Setup |
|----------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:BANDwidth:INTEgration <bandwidth> [:SENSe] :CHPower:BANDwidth:INTEgration? |
| Example | CHP:BAND:INT 10MHz CHP:BAND:INT? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For MSR/LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application. |
| Couplings | The minimum value of the span is coupled with the integration bandwidth. |
| Preset | SA: 2 MHz WCDMA: 5 MHz C2K: 1.23 MHz WIMAX OFDMA: 10 MHz 1xEVDO: 1.23 MHz DVB-T/H: 7.61 MHz DTMB (CTTB): 8MHz ISDB-T: 5.6MHz CMMB: 8MHz LTE: 5 MHz LTETDD: 5 MHz Digital Cable TV: 8MHz WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM): 20 MHz if Radio Std is 802.11b: 25 MHz if Radio Std is 802.11n(20MHz): 20 MHz if Radio Std is 802.11n(40MHz): 40 MHz if Radio Std is 802.11ac (20 MHz): 20 MHz if Radio Std is 802.11ac (40 MHz): 40 MHz if Radio Std is 802.11ac (80 MHz): 80 MHz if Radio Std is 802.11ac (160 MHz): 160 MHz |

| | |
|--------------------------|---|
| | if Radio Std is 802.11ac (80 MHz + 80 MHz): 80 MHz if Radio Std is 802.11ah (1 MHz): 1 MHz if Radio Std is 802.11ah (2 MHz): 2 MHz if Radio Std is 802.11ah (4 MHz): 4 MHz if Radio Std is 802.11ah (8 MHz): 8 MHz if Radio Std is 802.11ah (16 MHz): 16 MHz if Radio Std is 802.11j/p (20 MHz): 20 MHz if Radio Std is 802.11j/p (10 MHz): 10 MHz if Radio Std is 802.11p (5 MHz): 5 MHz |
| State Saved | Saved in instrument state. |
| Min | 100 Hz |
| Max | Hardware Maximum Span |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.14.50 |

Method

Turns the Root Raised Cosine (RRC) filter On or Off. The α value (roll off) for the filter is set to the value of the Filter Alpha parameter, and the RRC filter bandwidth is set to the Filter BW parameter.

| Key Path | Meas Setup |
|----------------|--|
| Mode | SA, WCDMA, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :CHPower :FILTer [:RRC] [:STATe] OFF ON 0 1</code> <code>[:SENSe] :CHPower :FILTer [:RRC] [:STATe] ?</code> |
| Example | CHP:FILT OFF CHP:FILT? |
| Notes | This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, WLAN mode, WIMAX OFDMA mode or W-CDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For CDMA2K mode, this key is blank. For 1xEVDO mode, this key is blank. For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application For WLAN 802.11 ac (80 + 80 MHz), RRC Weighted is not supported . |
| Preset | OFF |

| | |
|--------------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | Integ BW RRC Weighted |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |

Method

Turns the Root Raised Cosine (RRC) filter On or Off. The α value (roll off) for the filter is set to the value of the Filter Alpha parameter, and the RRC filter bandwidth is set to the Filter BW parameter.

| Key Path | Meas Setup |
|--------------------------|--|
| Mode | SA, WCDMA,WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:FILTer [:RRC] [:STATe] OFF ON 0 1 [:SENSe] :CHPower:FILTer [:RRC] [:STATe] ? |
| Example | CHP:FILT OFF CHP:FILT? |
| Notes | This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, WLAN mode,WIMAX OFDMA mode or W-CDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For CDMA2K mode, this key is blank. For 1xEVDO mode, this key is blank. For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compitible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application For WLAN 802.11 ac (80 + 80 MHz), RRC Weighted is not supported . |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Integ BW RRC Weighted |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |

Filter Alpha

Inputs the alpha value for the Root Raised Cosine (RRC) filter.

| Key Path | Meas Setup, Method |
|----------|---|
| Mode | SA, WCDMA,WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable |

| | |
|---------------------------------|---|
| | TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:FILTer[:RRC]:ALPHa <real> [:SENSe] :CHPower:FILTer[:RRC]:ALPHa? |
| Example | CHP:FILT:ALPH 0.5 CHP:FILT:ALPH? |
| Notes | This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, WLAN mode, WIMAX OFMDA mode or W-CDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For CDMA2K mode, this key is blank. For 1xEVDO mode, this key is blank. For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application |
| Preset | SA, WCDMA, , WIMAX OFMDA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, WLAN: 0.22 DTMB (CTTB): 0.05 Digital Cable TV: 0.15 |
| State Saved | Saved in instrument state. |
| Min | 0.01 |
| Max | 1.00 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |

Filter BW

Inputs the Root Raised Cosine (RRC) filter bandwidth. Normally, the filter bandwidth is the same as the symbol rate of the signal.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Method, RRC Weighted |
| Mode | SA, WCDMA, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:FILTer[:RRC]:BANDwidth <real> [:SENSe] :CHPower:FILTer[:RRC]:BANDwidth? |
| Example | CHP:FILT:BAND 10MHz CHP:FILT:BAND? |
| Notes | This parameter is normally used when TETRA is selected as the Radio Std. You must be in the Spectrum Analysis mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, WLAN mode, WIMAX OFMDA mode or W-CDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For CDMA2K mode, this key is blank. |

| | |
|-------------------------------------|---|
| | <p>For 1xEVDO mode, this key is blank. For MSR mode, this key is blank. For LTE-Advanced FDD/TDD, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application</p> |
| Preset | <p>SA, LTE, LTETDD: 3.84MHz WCDMA: 3.84MHz WIMAX OFDMA: 10MHz DVB-T/H: 8MHz DTMB (CTTB): 7.56MHz ISDB-T: 5.6MHz CMMB: 7.512MHz Digital Cable TV: 6.9MHz WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM): 16.6 MHz if Radio Std is 802.11b: 22 MHz if Radio Std is 802.11n(20MHz): 17.8 MHz if Radio Std is 802.11n(40MHz): 36.6 MHz</p> |
| State Saved | Saved in instrument state. |
| Min | 100 Hz |
| Max | 100 MHz |
| Backwards Compatibility SCPI | [:SENSe] :CHPower:FILTer [:RRC] :BWIDth |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |

Limits

Accesses the Limits menu that allows you to set up the test limit for channel power or power spectral density.

| Key Path | Meas Setup |
|----------------------|------------|
| Initial S/W Revision | A.10.00 |

Power Limit

If Power Limit is on, Power Limit is used as threshold which can judge whether the real measured channel power can be passed or not. If real measured channel power exceeds Power Limit, channel power test fails, otherwise, it passes. If Power Limit is off, channel power test is always passed.

| Key Path | Meas Setup, Limits |
|-----------------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:LIMit:POWer <ampl> :CALCulate:CHPower:LIMit:POWer? :CALCulate:CHPower:LIMit:POWer:STATe OFF ON 0 1 :CALCulate:CHPower:LIMit:POWer:STATe? |
| Example | CALC:CHP:LIM:POW 16.00 CALC:CHP:LIM:POW? CALC:CHP:LIM:POW:STAT ON CALC:CHP:LIM:POW:STAT? |
| Notes | This parameter and PSD Limit can determine Pass/Fail criteria. If ((power limit = On) and (PSD limit= Off)) Pass if (power test passes) Fail if (power test fails) If ((power limit = On) and (PSD limit= On)) Pass if (both power test and PSD test pass) Fail if (either of power test or PSD test fails) If ((power limit = Off) and (PSD limit= On)) Pass if (PSD test passes) Fail if (PSD test fails) If ((power limit = Off) and (PSD limit= Off)) Always Pass For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application For WLAN 802.11ac (80 MHz + 80 MHz), the power test and the PSD test are performed to both carriers. Which means the power (or PSD) readouts of both carriers should be compared with the power (or PSD) limit individually, and the test passes only when both values are lower than the limit. |
| Preset | 16.00 SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV: OFF WLAN: ON |
| State Saved | Saved in instrument state. |
| Min | -200.0 |
| Max | 200.0 |
| Initial S/W Revision | A.10.00 |

PSD Limit

If PSD (power spectral density) Limit is ON, PSD Limit is used as threshold which can judge whether the real measured PSD can be passed or not. If real measured PSD exceeds PSD Limit, PSD test fails, otherwise, it passes. If PSD is off, PSD test is always passed.

| Key Path | Meas Setup, Limits |
|----------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, LTE, LTETDD, Digital Cable TV, WLAN |
| Remote Command | :CALCulate:CHPower:LIMit:PSDensity <real> :CALCulate:CHPower:LIMit:PSDensity? :CALCulate:CHPower:LIMit:PSDensity:STATe OFF ON 0 1 :CALCulate:CHPower:LIMit:PSDensity:STATe? |
| Example | CALC:CHP:LIM:PSD 4.00 CALC:CHP:LIM:PSD? CALC:CHP:LIM:POW:STAT ON CALC:CHP:LIM:POW:STAT? |
| Notes | This parameter and Power Limit can determine Pass/Fail criteria. If ((power limit = On) and (PSD limit= Off)) Pass if (power test passes) Fail if (power test fails) If ((power limit = On) and (PSD limit= On)) Pass if (both power test and PSD test pass) Fail if (either of power test or PSD test fails) If ((power limit = Off) and (PSD limit= On)) Pass if (PSD test passes) Fail if (PSD test fails) If ((power limit = Off) and (PSD limit= Off)) Always Pass For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank. For WLAN 802.11ac (80 MHz + 80 MHz), the power test and the PSD test are performed to both carriers. Which means the PSD (or power) readouts of both carriers should be compared with the PSD (or power) limit individually, and the test passes only when both values are lower than the limit. |
| Couplings | The value is automatically converted when PSD Unit is changed. |
| Preset | 4.00 SA, WCDMA, C2K, WIMAX OFDMA, 1Xevdo, LTE, LTETDD, Digital Cable TV: OFF WLAN: ON |
| State Saved | Saved in instrument state. |
| Min | -200.0 |
| Max | 200.0 |
| Initial S/W Revision | A.10.00 |

Power Limit Fail (remote command only)

The command is query only and used to query if power test passes or fails.

| | |
|-----------------------------|--|
| Remote Command | :CALCulate:CHPower:LIMit:POWer:FAIL? |
| Example | CALC:CHP:LIM:POW:FAIL? |
| Notes | <p>This command is query only.</p> <p>When Power Limit is off, the returned value is always 0 (pass).</p> <p>When Power Limit is on, the returned value is 0(pass) while power test passes and 1 (fail) while power test fails.</p> <p>In MSR, LTE-Advanced FDD/TDD mode, this feature is not supported.</p> <p>In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application.</p> |
| Initial S/W Revision | A.10.00 |

PSD Limit Fail (remote command only)

The command is query only and used to query if PSD test passes or fails.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:CHPower:LIMit:PSD:FAIL? |
| Example | CALC:CHP:LIM:PSD:FAIL? |
| Notes | <p>This command is query only.</p> <p>When PSD Limit is off, the returned value is always 0 (pass).</p> <p>When PSD Limit is on, the returned value is 0(pass) while PSD test passes and 1 (fail) while PSD test fails.</p> |
| Initial S/W Revision | A.10.00 |

PSD Unit

Sets the unit bandwidth for Power Spectral Density. The available units are dBm/Hz and dBm/MHz.

| Key Path | Meas Setup |
|-----------------------|--|
| Mode | SA, WCDMA, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :UNIT:CHPower:POWer:PSD DBMHZ DBMMHZ :UNIT:CHPower:POWer:PSD? |
| Example | UNIT:CHP:POW:PSD DBMMHZ UNIT:CHP:POW:PSD? |
| Couplings | When the PSD unit is changed, the PSD result of the "MEAS READ FETCH:CHP1?" is also changed by the PSD unit basis (in either dBm/Hz or dBm/MHz). |

| | |
|--------------------------|----------------------------|
| Preset | DBMHZ WLAN: DBMMHZ |
| State Saved | Saved in instrument state. |
| Range | dBm/Hz dBm/MHz |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Meas Preset

Restores all the measurement parameters to their default values.

| | |
|--------------------------|---|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CONFigure:CHPower |
| Example | CONF:CHP |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Mode

See "Mode" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 441 for more information.

| | |
|--------------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST : PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPlE ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODEs | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPut | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGn | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

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Mode Preset

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Places the selected marker on the trace point with the maximum y-axis value. Pressing Peak Search with the selected marker Off causes the selected marker to be set to Normal, then a peak search is immediately performed.

| | |
|---------------------------------|---|
| Key Path | Front panel key |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:MAXimum |
| Example | CALC:CHP:MARK2:MAX |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Print

See "Print " on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<>mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 450.

| Key Path | Recall |
|-----------------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

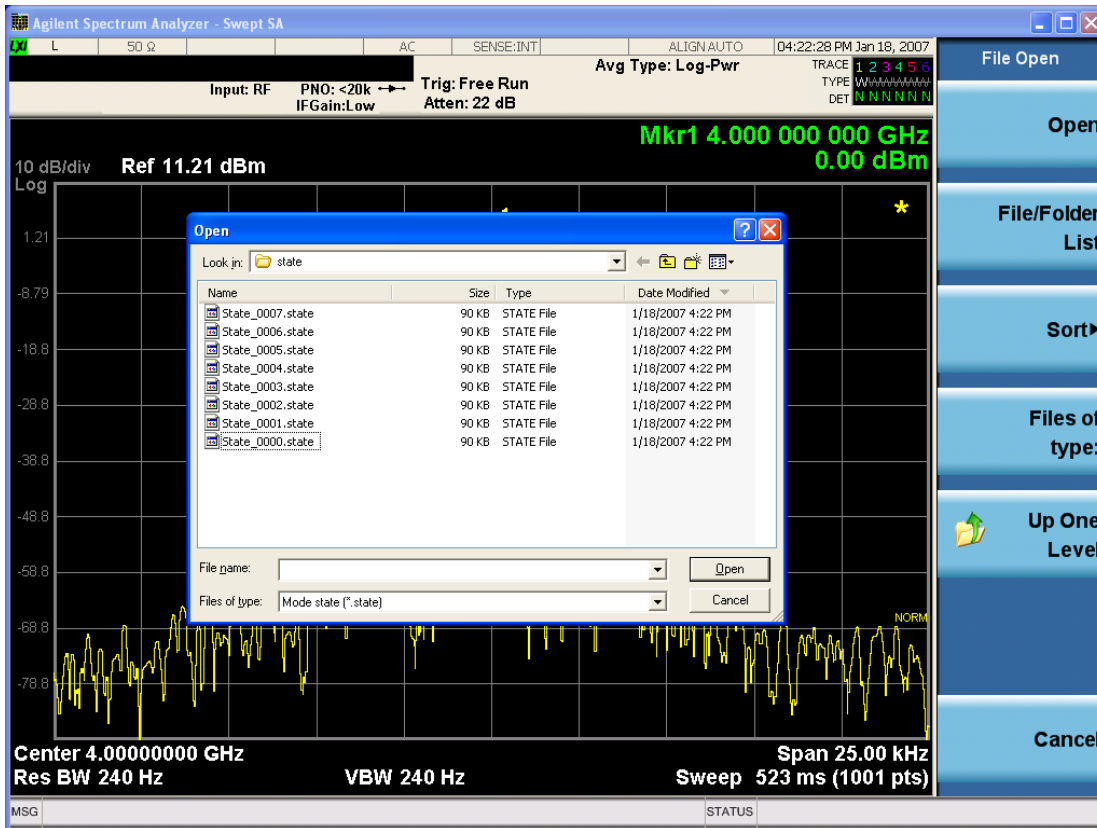
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In** field first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|--|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| Key Path | Recall, Data |
|----------------------|--|
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| Key Path | Recall |
|----------------------|--|
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMoRY:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 458

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|-----------------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

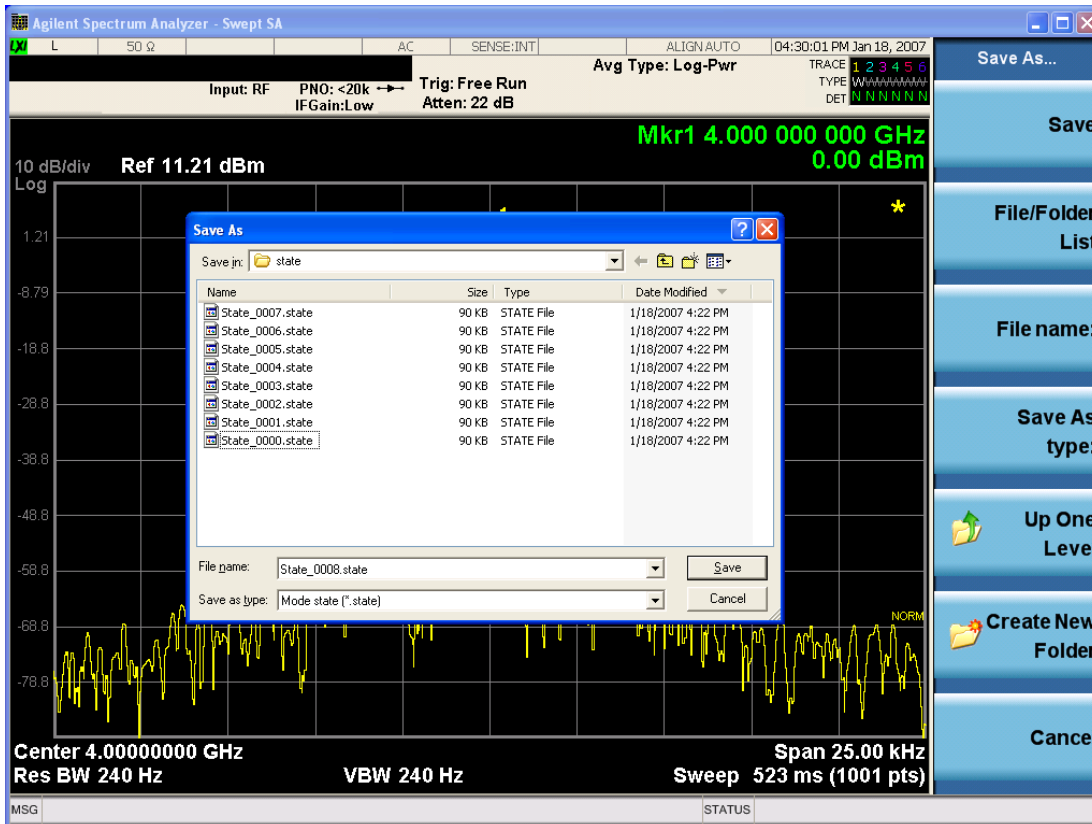
| | |
|-----------------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|------------------------------------|
| Backwards Compatibility SCPI | :MMEMoRY:STORe:STATe 1, <filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 463](#)

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

Key path **SCPI Only**

Remote Command :MMEMory:RDIRECTory <directory_name>

Notes The string must be a valid logical path.
Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.
This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.

Initial S/W Revision Prior to A.02.00

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path **Save, Sequences**

Mode All

Remote Command :MMEM:STOR:SEQences: | SLIST | ALIST | SAAList | SSTep
"MySequence.txt"

Example :MMEM:STOR:SEQ:SLIST "MySequence.txt"

Notes Available file types are:
–CSV (Comma delimited) (*.csv)
–Text (Tab delimited) (*.txt)

Initial S/W Revision A.05.00

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|----------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "To File . . ." on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

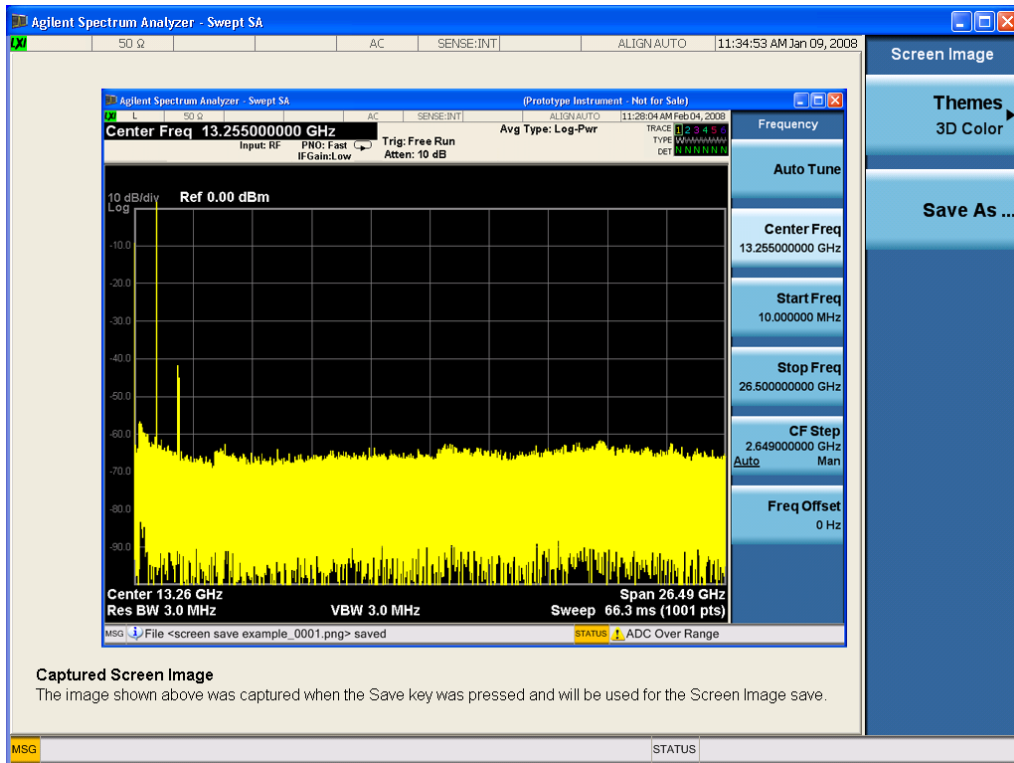
Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:

8 Channel Power Measurement

Save



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReEn:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReEn:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 475

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------------|---|
| Remote Command | :OUTPut[:EXTErnal][:STATe] ON OFF 1 0 :OUTPut[:EXTErnal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|-----------------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 478](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 478 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 478 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| | |
|----------------------|---|
| Key Path | Source, Amplitude |
| Dependencies | This key is unavailable, and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------------|---|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on " List Sequencer " on page 2585. If the " Sequencer " on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " Sequencer " on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 482](#),

"W-CDMA Channel Number Ranges" on page 483, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 484, and "LTE FDD Channel Number Ranges" on page 486.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|----------------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------------|---------------|-------------------------|---------------------|
| Band IX | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| Band X | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| | | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | Downlink | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| Band XI | Uplink | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| | Downlink | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| Band XII | Uplink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| | Downlink | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| $3927 \leq n \leq 3992$ | | $n \div 5 - 54.9$ | |
| $3612 \leq n \leq 3678$ | | $n \div 5 - 22$ | |
| Band XIII | Uplink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| | Downlink | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| Band XIV | Uplink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| | Downlink | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| Band XIX | Uplink | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| | | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| | Downlink | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 * N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | | 2110 | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | | 1930 | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | | 1805 | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | | 2110 | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | | 869 | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | | 875 | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | | 2620 | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | | 925 | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | | 1844.9 | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | | 2110 | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | | 1475.9 | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | | 729 | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | | 746 | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | | 758 | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | | 734 | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | | 860 | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 – 6149 | 830 | 24000 | 24000 – 24149 |
| 20 | 791 | 6150 | 6150 – 6449 | 832 | 24150 | 24150 – 24449 |
| 21 | 1495.9 | 6450 | 6450 – 6599 | 1447.9 | 24450 | 24450 – 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 – 8039 | 1626.5 | 25700 | 25700 – 26039 |
| 25 | 1930 | 8040 | 8040 – 8689 | 1850 | 26040 | 26040 – 26689 |
| 26 | 859 | 8690 | 8690 – 9039 | 814 | 26690 | 26690 – 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 – 36199 | 1900 | 36000 | 36000 – 36199 |
| 34 | 2010 | 36200 | 36200 – 36349 | 2010 | 36200 | 36200 – 36349 |
| 35 | 1850 | 36350 | 36350 – 36949 | 1850 | 36350 | 36350 – 36949 |
| 36 | 1930 | 36950 | 36950 – 37549 | 1930 | 36950 | 36950 – 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|---------------|
| 37 | 1910 | 37550 | 37550 - 37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 - 38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 - 38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 - 39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900-1920 MHz | 9504 to 9596 |
| | 2010-2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850-1910 MHz | 9254 to 9546 |
| | 1930-1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910-1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570-2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300-2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880-1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSMS DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|----------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|-----------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|-----------------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEvice BTS MS :SOURce:RADio:DEvice? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|---|
| | <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm" |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540](#).

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command `:SOURce:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...`

(For additional description of each item, see Notes below ["For Setup SCPI" on page 540](#) "For Setup SCPI".)

`:SOURce:RADio:ARB:SEQuence[:MWAveform]? <filename>`

(For additional description of each item, see Notes ["For Query SCPI" on page 541](#) below.)

Example For setup:

`>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3`

Or

`>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1 M3`

For query, must specify which waveform sequence file to query.

`>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"`

Or

`>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",`

Notes For Setup SCPI

For the Setup SCPI command, the parameters are:

`<filename>` - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

`<waveform1>` - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
If the waveform sequence file name is empty, an error is generated.
If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
|----------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
|----------|--|

| | |
|--------------|---|
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
|--------------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
|----------|---|

| | |
|--------------|--|
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
|--------------|--|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
|----------|---|

| | |
|-----------------------|--|
| Remote Command | <code>:SYSTem:LKEY:WAVeform:REPLace <int>, <string></code> |
|-----------------------|--|

or

| | |
|--|---|
| | <code>:SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string></code> |
|--|---|

| | |
|----------------|---|
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" |
|----------------|---|

or

| | |
|--|---|
| | :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
|--|---|

| | |
|-------|--|
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
|-------|--|

If you attempt to license a waveform that is already licensed using another slot an error is generated.

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|----------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path **Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses**

Remote Command :SYSTem:LKEY:WAVeform:LOCK <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>

Example SYST:LKEY:WAV:LOCK 1
or
SYST:LIC:WAV:LOCK 1

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command :SYSTem:LKEY:WAVeform:STATus? <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>

Example :SYST:LKEY:WAV:STAT? 1
<"Locked"
or
:SYST:LIC:WAV:STAT? 1
<"Locked"

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"> |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|-----------------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|--|
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTernal EXTernal2 KEY BUS EXTernal4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTernal4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:DEFault:DIRectory <string>
 :SOURce:RADio:ARB: DEFault:DIRectory?

Example :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"
 :SOUR:RAD:ARB:DEF:DIR?

State Saved Persistent, survives a power cycle and a preset but not saved in the instrument state

Initial S/W Revision A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMediate INTernal KEY BUS EXTernal2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|----------|---|
| R | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... |
| e | :SOURce:LIST:SETup:RADio:BAND? |
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| E | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM |
| X | :SOUR:LIST:SET:RAD:BAND? |
| a | |
| m | |
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| l | |

e

N The command is to setup below parameter array of whole list sequence.

O Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591.

t If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e page 2587.

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFfrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFfrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|--|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTInuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
:SOURce:LIST:SETup:TOCount?

Example :SOUR:LIST:SET:TOC 1s,2s,3s
:SOUR:LIST:SET:TOC?
:SOUR:LIST:SET:TOC 5,6,7
:SOUR:LIST:SET:TOC?

Notes The command is to setup below parameter array of whole list sequence.
Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 2616](#) and ["Play Count" on page 2617](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
If current ["Step Duration" on page 2616](#) is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"

Dependencies The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
:SOURce:LIST:SETup:OUTPut:TRIGger ?

Example :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON
:SOUR:LIST:SET:OUTP:TRIG?

Notes The command is to setup below parameter array of whole list sequence.
Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 2618](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

Span X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Span

Changes the frequency range symmetrically about the center frequency.

The default (and minimum) Span is calculated using the number of carriers and the carrier width where;

$$\text{Span} = (\text{Upper Carrier Freq} + (\text{max offset IBW} * (1 + \alpha)) / 2) - (\text{Lower Carrier Freq} - (\text{max offset IBW} * (1 + \alpha)) / 2)$$

The span is increased by a factor of 1 + Filter Alpha if the RRC Filter in on.

| Key Path | Span X Scale |
|----------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | <pre>[:SENSe] :CHPower:FREQuency:SPAN <freq> [:SENSe] :CHPower:FREQuency:SPAN? [:SENSe] :CHPower:FREQuency:SPAN:AUTO ON OFF 1 0 [:SENSe] :CHPower:FREQuency:SPAN:AUTO?</pre> |
| Example | <pre>CHP:FREQ:SPAN 10 MHz CHP:FREQ:SPAN? :CHP:FREQ:SPAN:AUTO OFF :CHP:FREQ:SPAN:AUTO?</pre> |
| Notes | <p>You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, LTE-Advanced FDD mode, LTE-Advanced TDD mode, WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode.</p> <p>Span Auto/Man State ([:SENSe] :CHPower:FREQuency:SPAN:AUTO) is only available in LTE/LTE-Advanced FDD and LTE/LTE-Advanced TDD modes. The BAF SCPI is LTE/LTE-Advanced FDD and LTE/LTE-Advanced TDD modes only.</p> <p>The span value will be adjusted when the relevant carrier parameters such as bandwidth, itegration bandwidth, number of component carriers etc. are changed whatever the span state is Auto or Man.</p> <p>When in Man state, if the input value is less than the required sum of total integration bandwidths and gaps of the multi-carriers, the required span value will be set.</p> |
| Dependencies | <p>For MSR mode, this key is blank.</p> <p>For WLAN 802.11ac (80 MHz + 80 MHz), the key is not enabled and its value is coupled with the spacing between the center frequencies of the two carriers.</p> <p>Span = Center Frequency 1 – Center Frequency 2 + Integ BW + 40 MHz Margin.</p> <p>When the calculated span is over 1 GHz, it's still coupled to its maximum value, which is 1 GHz.</p> |

| | |
|-----------|---|
| Couplings | <p>When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of span /RBW is approximately 106:1. When the Res BW is set to Man, bandwidths are entered by the user, and these bandwidths are used regardless of other analyzer settings.</p> <p>Since Span is coupled to Integ BW in the factory default condition, if you change the integration bandwidth setting, the span setting changes by a proportional amount until a limit value is reached. However, the span can be individually set. The minimum value of the span is coupled with the integration bandwidth.</p> <p>When the state of Span is Auto, the span value is automatically determined by multi-carrier configuration. Otherwise, the span can accept User's input.</p> <p>When the span value is set manually, the state of span is automatically changes to Man.</p> |
| Preset | <p>SA: 3 MHz</p> <p>WCDMA: 7.5 MHz</p> <p>C2K: 1.845 MHz</p> <p>WIMAX OFDMA: 20 MHz</p> <p>1xEVDO: 2.0MHz</p> <p>DVB-T/H: 10MHz</p> <p>DTMB (CTTB): 10MHz</p> <p>ISDB-T: 10MHz</p> <p>CMMB: 10MHz</p> <p>LTE: 7.5 MHz</p> <p>LTETDD: 7.5 MHz</p> <p>Digital Cable TV: 10MHz</p> <p>WLAN:</p> <p>if Radio Std is 802.11a/g(OFDM/DSSS-OFDM): 30 MHz</p> <p>if Radio Std is 802.11b: 37.5MHz</p> <p>if Radio Std is 802.11n(20MHz): 30 MHz</p> <p>if Radio Std is 802.11n(40MHz): 60 MHz</p> <p>if Radio Std is 802.11ac (20 MHz): 30 MHz</p> <p>if Radio Std is 802.11ac (40 MHz): 60 MHz</p> <p>if Radio Std is 802.11ac (80 MHz): 120 MHz</p> <p>if Radio Std is 802.11ac (160 MHz): 240 MHz</p> <p>if Radio Std is 802.11ac (80 MHz + 80 MHz): 360 MHz</p> <p>if Radio Std is 802.11ah (1 MHz): 1.5 MHz</p> <p>if Radio Std is 802.11ah (2 MHz): 3 MHz</p> <p>if Radio Std is 802.11ah (4 MHz): 6 MHz</p> <p>if Radio Std is 802.11ah (8 MHz): 12 MHz</p> <p>if Radio Std is 802.11ah (16 MHz): 24 MHz</p> <p>if Radio Std is 802.11j/p (20 MHz): 30 MHz</p> <p>if Radio Std is 802.11j/p (10 MHz): 15 MHz</p> <p>if Radio Std is 802.11p (5 MHz): 7.5 MHz</p> <p>ON</p> |

| | |
|--------------------------|---------------------------------|
| State Saved | Saved in instrument state. |
| Min | 100 Hz |
| Max | Hardware Maximum Span |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A14.50,A16.00 |

Full Span

Changes the span to show the full frequency range of the spectrum analyzer.

| Key Path | Span X Scale |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:FREQuency:SPAN:FULL |
| Example | CHP:FREQ:SPAN:FULL |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application |
| Couplings | Selecting full span changes the measurement span value. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Last Span

Changes the span to the previous span setting. If no previous span value exists, then the span remains unchanged.

| Key Path | Span X Scale |
|----------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :CHPower:FREQuency:SPAN:PREVious |
| Example | CHP:FREQ:SPAN:PREV |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, |

| | |
|--------------------------|---|
| | WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Dependencies | For MSR mode, this key is blank. For LTE-Advanced FDD/TDD mode, when the key is pressed, the state of SPAN key is changed to Man. If the previous span value is less than the required sum of total integration bandwidths and gaps of the multi-carriers, the value is set to the span value instead of the previous one. |
| Couplings | Selecting last span changes the measurement span value. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.14.50 |

Sweep/Control

Accesses a menu of functions that enable you to set up and control the time and source for the current measurement. See "[Sweep/Control](#)" on page 2634 for more information.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Sweep Time

| Key Path | Sweep/Control |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <pre>[:SENSe] :CHPower:SWEep:TIME <time> [:SENSe] :CHPower:SWEep:TIME? [:SENSe] :CHPower:SWEep:TIME:AUTO OFF ON 0 1 [:SENSe] :CHPower:SWEep:TIME:AUTO?</pre> |
| Example | <pre>CHP:SWE:TIME 25ms CHP:SWE:TIME? CHP:SWE:TIME:AUTO OFF CHP:SWE:TIME:AUTO?</pre> |
| Preset | SA, WIMAX OFDMA: Automatically Calculated WCDMA: 1.0 ms CDMA2K: 9.4ms 1xEVDO: 2.66ms DVB-T/H: Automatically Calculated DTMB (CTTB): Automatically Calculated ISDB-T: Automatically Calculated CMMB: Automatically Calculated LTE, MSR: Automatically Calculated LTETDD: Automatically Calculated Digital Cable TV: Automatically Calculated WLAN: Automatically Calculated LTEAFDD,LTEATDD:Automatically Calculated |
| State Saved | Saved in instrument state. |
| Max | 4000 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Sweep Setup

Accesses a menu that enables you to set the sweep state for the current measurement.

| Key Path | Sweep/Control |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting **Auto Sweep Time** to **Accy** results in slower sweep times, usually about three times as long, but yields better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when **Auto Sweep Time** is set to **Accy**.

Additional amplitude errors which occur when **Auto Sweep Time** is set to **Norm** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **Norm** is the preferred setting of **Auto Sweep Time**. **Auto Sweep Time** is set to **Norm** on a **Preset** or **Auto Couple**. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

| Key Path | Sweep/Control, Sweep Setup |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSE] :CHPower :SWEep :TIME :AUTO :RULEs NORMal ACCuracy [:SENSE] :CHPower :SWEep :TIME :AUTO :RULEs ? |
| Example | CHP:SWE:TIME:AUTO:RUL NORM CHP:SWE:TIME:AUTO:RUL? |
| Notes | In Zero Span, this key is irrelevant and inaccessible (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication. Set to Norm when Auto Couple is pressed or sent remotely |
| Preset | NORMal |
| State Saved | Saved in instrument state. |
| Range | Norm Accy |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused. See "[Pause/Resume](#)" on page 2634 for more details.

| | |
|----------------------|----------------------|
| Key Path | Sweep/Control |
| Initial S/W Revision | Prior to A.02.00 |

Gate

Accesses a menu that enables you to control the gating function. The Gate functionality is used to view signals best viewed by qualifying them with other events.

Gate setup parameters are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset.

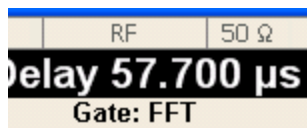
| | |
|----------------------|---|
| Key Path | Sweep/Control |
| Scope | Meas Global |
| Readback | The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT. |
| Initial S/W Revision | Prior to A.02.00 |

Gate On/Off

Turns the gate function on and off.

When the Gate Function is on, the selected Gate Method is used along with the gate settings and the signal at the gate source to control the sweep system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the measurement bar reflects that it is on and what method is used, as seen in the following "Gate: FFT" annunciator graphic.



| | |
|----------------|---|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe [:STATe] OFF ON 0 1 [:SENSe] :SWEep:EGATe [:STATe] ? |
| Example | SWE:EGAT ON SWE:EGAT? |
| Dependencies | When in the ACP measurement: <ul style="list-style-type: none"> • When Meas Method is RBW or FAST, this function is unavailable and the key is grayed out. • Whenever Gate is on, Meas Method, RBW or FAST is unavailable and keys for those are grayed |

| | |
|-------------------------------------|---|
| | <p>out.</p> <ul style="list-style-type: none"> • When Gate is on, Offset Res BW and Offset Video BW are ignored (if you set these values) and the measurement works as if all Offset Res BW and all Offset Video BW are coupled with the Res BW and the Video BW under the BW menu. When Gate is on, the Offset BW key in the Offset/Limit menu is grayed out. |
| Preset | Off LTETDD: On |
| State Saved | Saved in instrument state |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe]:SWEep:TIME:GATE[:STATe] ESA compatibility |
| Backwards Compatibility Notes | In ESA, Trig Delay (On) and Gate (On) could not be active at the same time.. This dependency does not exist in PSA or in the X-Series. |
| Initial S/W Revision | Prior to A.02.00 |

Gate View On/Off

Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window, showing the positions of the Gate, is shown between the Measurement Bar and the reduced measurement window. By reducing the height of the measurement window, some of the annotation on the Data Display may not fit and is not shown.

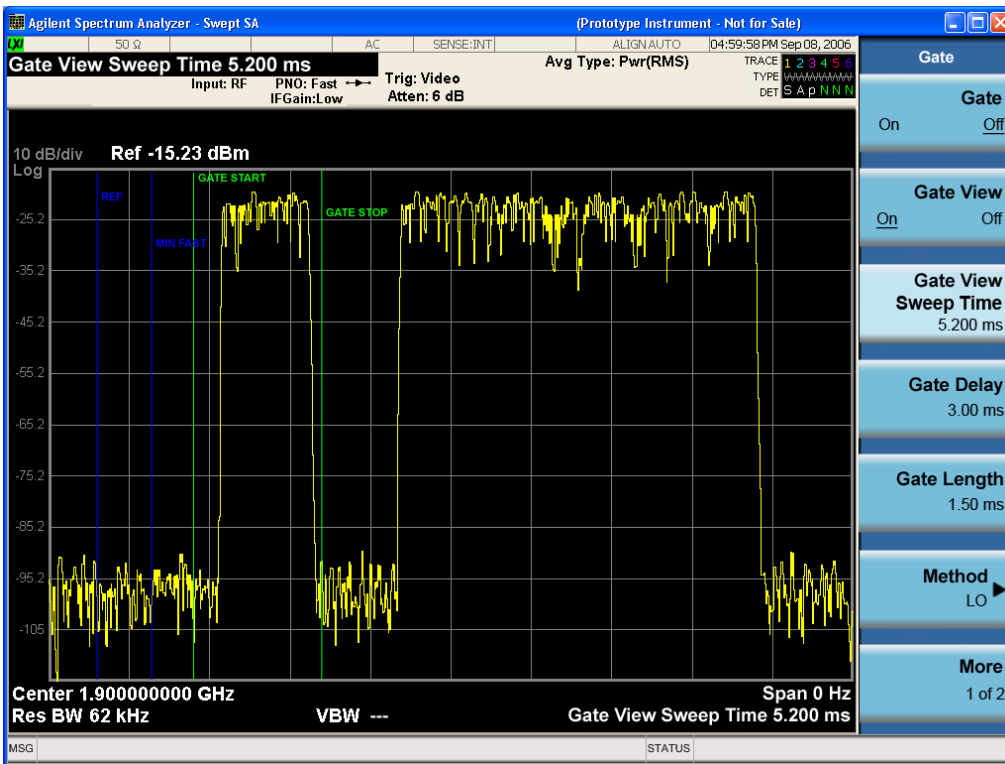
| | |
|-----------------------|---|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe]:SWEep:EGATe:VIEW ON OFF 1 0 [:SENSe]:SWEep:EGATe:VIEW? |
| Example | SWE:EGAT:VIEW ON turns on the gate view. |
| Dependencies | <p>In the Swept SA measurement:</p> <p>In Gate View, the regular Acq Time key is grayed out . When pressed, the grayed out key puts up the informational message "Use Gate View Sweep Time in the Gate menu."</p> <p>In the other measurements:</p> <p>When you turn Gate View on, the lower window takes on the current state of the instrument. Upon leaving Gate View, the instrument takes on the state of the lower window.</p> <p>When you turn Gate View on, the upper window Acquisition Time is set to the gate view acquisition time.</p> |
| Couplings | <p>These couplings apply to the Swept SA measurement:</p> <ul style="list-style-type: none"> • When Gate View is turned on, the instrument is set to Zero Span. • Gate View automatically turns off whenever a Span other than Zero is selected. • Gate View automatically turns off if you press the Last Span key while in Gate View, and the instrument returns to the Span it was in before entering Gate View (even if that is Zero Span). • When Gate View is turned on, the sweep time used is the gate view sweep time. This is set |

according to the rules in section "Gate View Setup " on page 1246

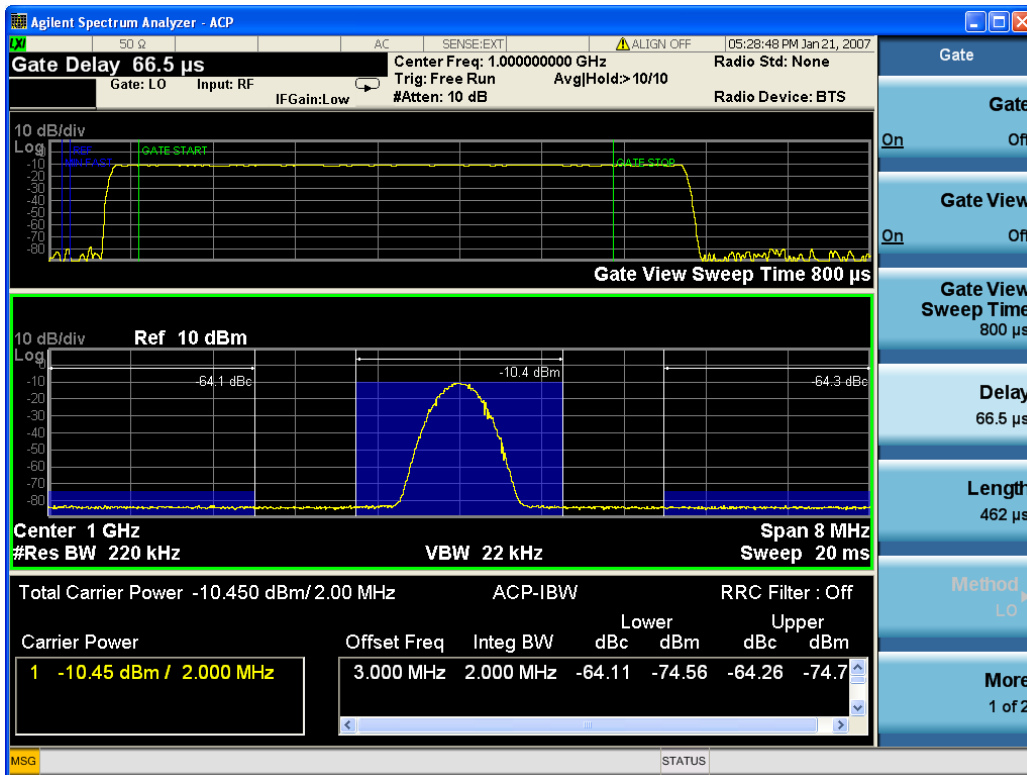
- When Gate View is turned off, Sweep Time is set to the normal Swept SA measurement sweep time.
- If Gate View is on and Gate is off, then turning on Gate turns off Gate View.

| | |
|----------------------|---------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

A sample of the Gate View screen in the Swept SA measurement is shown in the following graphic :



A sample of the Gate View screen in other measurements is shown in the following graphic . This example is for the ACP measurement:



Turning Gate View off returns the analyzer to the Normal measurement view.

In the Swept SA, the normal measurement view is the single-window Swept SA view. When returning to this view, the Swept SA measurement returns to the Span it was in before entering **Gate View** (even if that is Zero Span).

The **Gate View** window is triggered from the Gate Source, with zero trigger delay. Also, when updating the **Gate View** window, the Gate itself must not operate. So it is internally shut off while the gate view window is being updated. For the Swept SA measurement, this means that the Gate is internally shut off whenever the gate view window is displayed. The measurement bar and softkeys continue to show the Trigger source for the main sweep window and give no indication that the Gate is shut off or that the Gate View window is triggered from the Gate Source.

When in **Gate View**, vertical lines are displayed in the Gate View window as follows:

- Green lines are displayed at the gate edges as follows: in Edge Gate, a line is shown for Delay and one for the end of the Gate period, defined by Length. You can adjust the position of the green lines by adjusting the gate length and the gate delay. These lines update in the Gate View window as the active function changes, even if the window is not being updated. In Gated FFT, their location is relative to the left edge of the screen.
- A blue line is displayed showing the delay reference, that is, the reference point for the Gate Delay within the Zero Span window. The blue line represents where (in time) the effective location of the gate start would be if the gate were programmed to zero delay.
-

Gate View Setup

Accesses a menu that enables you to setup parameters relevant to the Gate View

| | |
|----------------------|----------------------------|
| Key Path | Sweep/Control, Gate |
| Scope | Meas Global |
| Initial S/W Revision | A.10.00 |

Gate View Acquisition Time

Controls the acquisition time in the Gate View window. To provide an optimal view of the gate signal, the analyzer initializes Gate View Acq Time based on the current settings of Gate Delay and Gate Length.

| | |
|-----------------------|---|
| Key Path | Sweep/Control, Gate, Gate View Setup |
| Remote Command | [:SENSe] :SWEep:EGATe:TIME <time> [:SENSe] :SWEep:EGATe:TIME? |
| Example | SWE:EGAT:TIME 500 ms |
| Dependencies | Gate View Acquisition Time is initialized: <ul style="list-style-type: none"> • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. <ol style="list-style-type: none"> 1. Compute the location of the "gate stop" line, which you know is at time $t = t_{min} + GateDelay + GateLength$. |
| Preset | 519.3 μ s WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 6000 s |
| Initial S/W Revision | Prior to A.02.00 |

Gate View Start Time

Controls the time at the left edge of the Gate View.

| | |
|-----------------------|--|
| Key Path | Sweep/Control, Gate, Gate View Setup |
| Remote Command | [:SENSe] :SWEep:EGATe:VIEW:STARt <time> [:SENSe] :SWEep:EGATe:VIEW:STARt? |
| Example | SWE:EGAT:VIEW:STAR 10ms |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. See error -131. |

| | |
|----------------------|---------------------------|
| Preset | 0 ms |
| State Saved | Saved in instrument state |
| Min | 0 |
| Max | 500 ms |
| Initial S/W Revision | A.10.00 |

Gate Delay

Controls the length of time from the time the gate condition goes True until the gate is turned on.

| Key Path | Sweep/Control, Gate |
|-------------------------------------|--|
| Remote Command | [:SENSe] :SWEep:EGATe:DELay <time> [:SENSe] :SWEep:EGATe:DELay? |
| Example | SWE:EGAT:DELay 500ms SWE:EGAT:DELay? |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 57.7 us WiMAX OFDMA: 71 us GSM/EDGE: 600 us WLAN: 500 us WLAN: 36 us |
| State Saved | Saved in instrument state |
| Min | 0.0 us |
| Max | 100 s |
| Backwards Compatibility SCPI | [:SENSe] :SWEep:TIME:GATE:DELay ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Length

Controls the length of time that the gate is on after it opens.

| Key Path | Sweep/Control, Gate |
|-----------------------|--|
| Remote Command | [:SENSe] :SWEep:EGATe:LENGth <time> [:SENSe] :SWEep:EGATe:LENGth? |
| Example | SWE:EGAT:LENG 1 SWE:EGAT:LENG? |

| | |
|-------------------------------------|--|
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us WLAN: 1.54 ms WLAN: 32 us |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 5 s |
| Backwards Compatibility SCPI | [:SENSe] :SWEep :TIME :GATE :LENGth ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Source

The menus under the **Gate Source** key are the same as those under the **Trigger key**, with the exception that neither **Free Run** nor **Video** are available as Gate Source selections. However, a different SCPI command is used to select the Gate Source (see table below) because you may independently set the Gate Source and the Trigger Source.

Any changes to the settings in the setup menus under each Gate Source selection key (for example: Trigger Level, Trigger Delay, etc.) also affect the corresponding settings under the Trigger menu keys. The SCPI commands used for these are the same for Trigger and Gate, since there is only one setting which affects both Gate and Trigger. Example: to set the Trigger Level for External 1 you use the command :TRIG:EXT1:LEV regardless of whether you are using External 1 as a Trigger Source or a Gate Source.

| Key Path | Sweep/Control, Gate |
|--------------------------|--|
| Remote Command | [:SENSe] :SWEep :EGATE :SOURCE EXTernal1 EXTernal2 LINE FRAME RFBurst [:SENSe] :SWEep :EGATE :SOURCE? |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" error. |
| Preset | EXTernal 1 GSM/EDGE, MSR: FRAME LTETDD: EXTernal 1 When Direction is Downlink, FRAME when Direction is Uplink. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE

When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

| | |
|-------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA |
| Notes | Log Plot and Spot Frequency measurements do not support Video Trigger |
| Dependencies | Video trigger is allowed in average detector mode. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

| | |
|-----------------------|--|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:LEVel <ampl> :TRIGger[:SEquence]:VIDeo:LEVel? |
| Example | TRIG:VID:LEV -40 dBm |
| Notes | When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until |

you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level.
Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.

| | |
|-------------------------------------|--|
| Couplings | This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu. |
| Preset | Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. |
| State Saved | Saved in instrument state |
| Min | -170 dBm |
| Max | +30 dBm |
| Default Unit | Depends on the current selected Y axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:LEVel :TRIGger[:SEquence]:IF:LEVel? |
| Backwards Compatibility Notes | This alias is provided for backward compatibility with VSA/PSA comms apps. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEquence]:VIDeo:SLOPe? |
| Example | TRIG:VID:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:SLOPe NEGative POSitive :TRIGger[:SEquence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |
| Remote Command | :TRIGger[:SEquence]:SLOPe POSitive NEGative |

| | |
|-------------------------------|---|
| | :TRIGger[:SEquence]:SLOPe? |
| Example | TRIG:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source. |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|-----------------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 |

| | |
|-------------------------------------|---|
| | selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel |
| Backwards Compatibility SCPI | For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:SLOPe |
| Backwards Compatibility SCPI | For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|----------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEQuence]:EXTErnal1:DELAy:COMPensation OFF ON 0 1 :TRIGger[:SEQuence]:EXTErnal1:DELAy:COMPensation? |
| Example | TRIG:EXT1:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| | |
|------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTErnal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger

events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|-----------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation? |
| Example | TRIG:EXT2:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| | |
|--------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| Key Path | Trigger, RF Burst |
|-------------------------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| Key Path | Trigger, RF Burst |
|-----------------------|---|
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:
3. absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level
4. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEquence]:RFBurst:LEVel:RELative? |
| Example | TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB |
| Notes | Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent. |
| Dependencies | This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering. |
| Preset | -6 dB GSM: -25 dB |
| State Saved | Saved in instrument state |
| Min | -45 dB |

| | |
|-------------------------------------|---|
| Max | 0 dB |
| Default Unit | dB or dBc |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:RFBurst:LEVel |
| | This legacy command is aliased to :TRIGger[:SEquence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

| | |
|-----------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Readback | [Sync: <value of Sync Source>], for example, [Sync: External 1] |
| Status Bits/OPC | |

| | |
|----------------------|--|
| dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

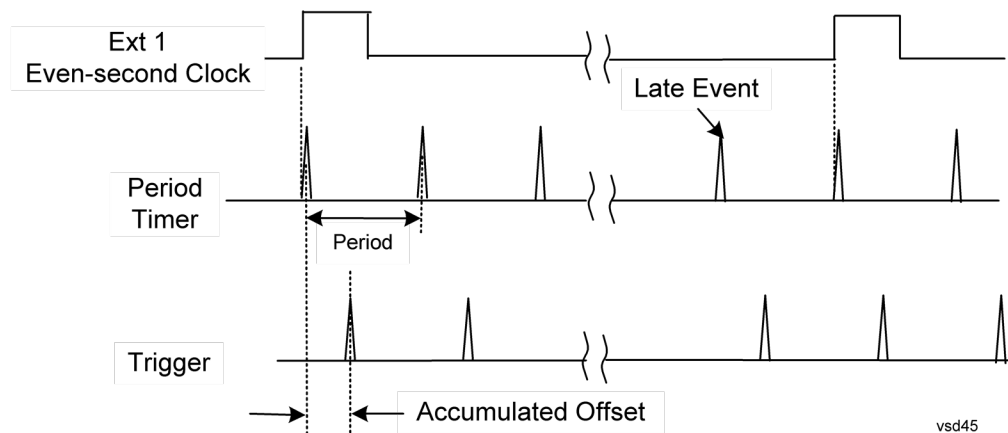
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not miss-trigger. Miss-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

| | |
|-----------------------------|---|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:PERiod <time> :TRIGger[:SEquence]:FRAMe:PERiod? |
| Example | TRIG:FRAM:PER 100 ms |
| Dependencies | The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes. |
| Couplings | The same period is used in the Gate Source selection of the period timer. |
| Preset | 20 ms GSM: 4.615383 |
| State Saved | Saved in instrument state |
| Min | 100.000 ns |
| Max | 559.0000 ms |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of

that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

| Key Path | Trigger, Periodic Timer |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet <time> :TRIGger[:SEquence]:FRAMe:OFFSet? |
| Example | TRIG:FRAM:OFFS 1.2 ms |
| Notes | <p>The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key).</p> <p>Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365.</p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.</p> |
| Notes | <p>When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value.</p> <p>The SCPI query simply returns the value currently showing on the key.</p> |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

| | |
|-----------------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:ADJust <time> |
| Example | TRIG:FRAM:ADJ 1.2 ms |
| Notes | Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365 An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event. |
| Notes | The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query. |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

| | |
|-----------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet |
| Example | TRIG:FRAM:OFFS:DISP:RES |
| Initial S/W Revision | Prior to A.02.00 |

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

| | |
|-------------------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal1 EXTernal2 RFBurst OFF :TRIGger[:SEquence]:FRAMe:SYNC? |
| Example | TRIG:FRAM:SYNC EXT2 |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. |
| Preset | Off GSM/EDGE, MSR,LTE,LTETDD: RFBurst |
| State Saved | Saved in instrument state |
| Readback | The current setting is read back to this key and it is also Readback to the previous Periodic Timer trigger key. |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

| | |
|-----------------------------|---|
| Key Path | Trigger, Periodic Timer, Sync Source |
| Example | TRIG:FRAM:SYNC OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|-----------------|-------------------------------------|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement |

| | |
|------------------------------|--|
| | TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:LEVel <level> :TRIGger[:SEquence]:EXTernal:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:SLOPe POSitive NEGative |

| | |
|-------------------------------------|--|
| | :TRIGger[:SEQuence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| Key Path | Trigger |
|-------------------------------|--|
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATE] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| Key Path | Trigger, RF Burst |
|-----------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the |

| | |
|-------------------------------------|--|
| | RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|--------------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

| Key Path | Trigger, Periodic Timer |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff <time> :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff? :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe? |
| Preset | On, 1.000 ms |
| State Saved | Saved in instrument state |
| Min | 0 ms |
| Max | +500 ms |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

| Key Path | Trigger |
|----------------------|--|
| Readback line | Displays a summary of the Auto Trig and Holdoff settings, in square brackets First line: Auto Off or Auto On Second Line: "HldP" followed by: <ul style="list-style-type: none"> • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal |
| Initial S/W Revision | A.02.00 |

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|---|
| Remote Command | :TRIGger[:SEquence]:ATRigger <time> :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe? |
| Example | TRIG:ATR:STAT ON TRIG:ATR 100 ms |
| Notes | The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 1 ms |
| Max | 100 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATe? |
| Example | TRIG:HOLD:STAT ON TRIG:HOLD 100 ms |
| Dependencies | Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 0 s |
| Max | 0.5 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Gate Preset (Remote Command Only)

Presets the time-gated spectrum analysis capability.

This command sets gate parameter values to the ESA preset values, as follows:

Gate trigger type = edge

Gate polarity = positive

Gate delay = 1 us

Gate length = 1 us

| | |
|-----------------------|--|
| Remote Command | <code>[:SENSe]:SWEep:TIME:GATE:PRESet</code> ESA Compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Level (Remote Command Only)

Sets the gate input transition point level for the external TRIGGER inputs on the front and rear panel. This is a legacy command for PSA compatibility. It is simply an alias to the equivalent trigger level command.

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe]:SWEep:EGATe:EXTernal[1] 2:LEVel <voltage></code> <code>[:SENSe]:SWEep:EGATe:EXTernal[1] 2:LEVel?</code> |
| Notes | This command is simply an alias to <code>:TRIGger[:SEQuence]:EXTernal[1] 2:LEVel</code> For details refer |
| Initial S/W Revision | Prior to A.02.00 |

Gate Polarity (Remote Command Only)

Sets the polarity for the gate signal. This setup is now done using the gate trigger's slope setting.

When Positive (Pos) is selected, a positive-going edge (Edge) or a high voltage (Level) will satisfy the gate condition, after the delay set with the Gate Delay key. When Negative (Neg) is selected, a negative-going edge (Edge) or a low voltage (Level) will satisfy the gate condition after the delay.

| | |
|-------------------------------------|---|
| Remote Command | <code>[:SENSe]:SWEep:EGATe:POLarity</code> NEGative POSitive <code>[:SENSe]:SWEep:EGATe:POLarity?</code> |
| Example | <code>SWE:EGAT:POL NEG</code> <code>SWE:EGAT:POL?</code> |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | <code>[:SENSe]:SWEep:TIME:GATE:POLarity</code> ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | <code>[:SENSe] :SWEep:TIME:GATE:LEVel HIGH LOW</code> <code>[:SENSe] :SWEep:TIME:GATE:LEVel?</code> ESA compatibility |
| Preset | HIGH |
| Initial S/W Revision | Prior to A.02.00 |

Points

Sets the number of points per sweep. The resolution of setting the time depends on the number of points selected. If Preset is selected, the number of points per sweep defaults to 1001. The current value of points is displayed parenthetically, next to the time in the lower-right corner of the display.

Changing the number of points has several effects on the analyzer. Since markers are read at the point location, the marker reading may change. All trace data is cleared.

| Key Path | Sweep/Control |
|-----------------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :CHPower:SWEep:POINts <integer></code> <code>[:SENSe] :CHPower:SWEep:POINts?</code> |
| Example | CHP:SWE:POIN 501 CHP:SWE:POIN? |
| Notes | Whenever the number of sweep points changes: All trace data is erased Any traces with Update Off also go to Display Off (like going from View to Blank in the older analyzers) time is re-quantized Any limit lines that are on are updated If averaging/hold is on, averaging/hold starts over |
| Couplings | Whenever the number of sweep points changes, the time is re-quantized. |
| Preset | DVB-T/H: 2001 DTMB (CTTB): 2001 Other: 1001 ISDB-T: 2001 CMMB: 2001 1xEVDO: 512 Digital Cable TV: 2001 |
| State Saved | Saved in instrument state. |
| Min | 101 |

| | |
|--------------------------|------------------|
| Max | 20001 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

System

See ["System" on page 278](#)

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Trace Type

Allows you to select the type of trace you want to use for the current measurement. The first page of this menu contains a 1-of-N selection of the trace type (**Clear Write, Average, Max Hold, Min Hold**) for the selected trace.

| | |
|--------------------------|---|
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :TRACe:CHPower:TYPE WRITe AVERAge MAXHold MINHold :TRACe:CHPower:TYPE? |
| Example | TRAC:CHP:TYPE WRIT TRAC:CHP:TYPE? |
| Notes | WRITe = Clear Write AVERAge = Average MAXHold = Maximum Hold MINHold = Minimum Hold |
| Couplings | When Detector setting is "Auto" ([:SENSe]:CHPower:DETECTOR:AUTO?), Detector ([:SENSe]:CHPower:DETECTOR[:FUNCTION]?) switches aligning with the switch of this parameter: "NORMal" with WRITe (Clear Write), "AVERAge" with AVERAge, "POSitive (peak)" with MAXHold, and "NEGative (peak)" with MINHold. |
| Preset | AVERAge |
| State Saved | Saved in instrument state. |
| Range | ClearWrite Average MaxHold MinHold |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement. The following choices are available:

- Auto– the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- Normal—the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average—the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak—the detector determines the maximum of the signal within the sweep points.
- Sample—the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak—the detector determines the minimum of the signal within the sweep points.

| Key Path | Detector |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Auto

Sets the detector for the currently selected trace to Auto.

| Key Path | Trace/Detector |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [[:SENSE]:CHPower:DETECTOR:AUTO ON OFF 1 0 [:SENSE]:CHPower:DETECTOR:AUTO? |
| Example | CHP:DET:AUTO ON CHP:DET:AUTO? |
| Couplings | When Detector setting is “Auto” ([[:SENSE]:CHPower:DETECTOR:AUTO?]), Detector ([[:SENSE]:CHPower:DETECTOR:FUNCTION?]) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold. |
| Preset | Others: ON DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV: OFF |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Detector Selection

Selects a detector to be used by the analyzer for the current measurement.

| Key Path | Trace/Detector |
|----------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |

| | |
|---------------------------------|---|
| Remote Command | [:SENSe]:CHPower:DETEctor[:FUNction] NORMal AVERAge POSitive SAMPle NEGative [:SENSe]:CHPower:DETEctor[:FUNction]? |
| Example | CHP:DET NORM CHP:DET? |
| Notes | <p>When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings.</p> <p>The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This method of detection is also referred to as Rosenfell detection.</p> <p>The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS).</p> <p>The Peak detector determines the maximum of the signal within the sweep points.</p> <p>The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.</p> <p>The Negative Peak detector determines the minimum of the signal within the sweep points.</p> |
| Couplings | When Detector setting is "Auto" ([:SENSe]:CHPower:DETEctor:AUTO?), Detector ([:SENSe]:CHPower:DETEctor[:FUNction]?) switches aligning with the switch of this parameter: "NORMal" with Clear Write, "AVERAge" with AVERAge, "POSitive (peak)" with MAXHold, and "NEGative (peak)" with MINHold. |
| Preset | AVERAge |
| State Saved | Saved in instrument state. |
| Range | Normal Average Peak Sample Negative Peak |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See ["Trig Delay "](#) on page 350

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off"](#) on page 1255

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Relative Trigger

See ["Relative Trigger Level"](#) on page 1257

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay "](#) on page 354

Periodic Timer

See ["Periodic Timer \(Frame Trigger\) "](#) on page 1259

Period

See ["Period "](#) on page 1260

Offset

See ["Offset "](#) on page 1261

Reset Offset Display

See ["Reset Offset Display "](#) on page 1263

Sync Source

See ["Sync Source "](#) on page 1263

Off

See ["Off "](#) on page 1264

External 1

See ["External 1 "](#) on page 1264

8 Channel Power Measurement Trigger

Trigger Level

See ["Trigger Level "](#) on page 1264

Trig Slope

See ["Trig Slope "](#) on page 1265

External 2

See ["External 2 "](#) on page 1265

Trigger Level

See ["Trigger Level "](#) on page 1266

Trig Slope

See ["Trig Slope "](#) on page 1267

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay"](#) on page 365

Auto/Holdoff

See ["Auto/Holdoff "](#) on page 1270

Auto Trig

See ["Auto Trig "](#) on page 1270

Trig Holdoff

See ["Trig Holdoff "](#) on page 1271

Holdoff Type

See ["Holdoff Type"](#) on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

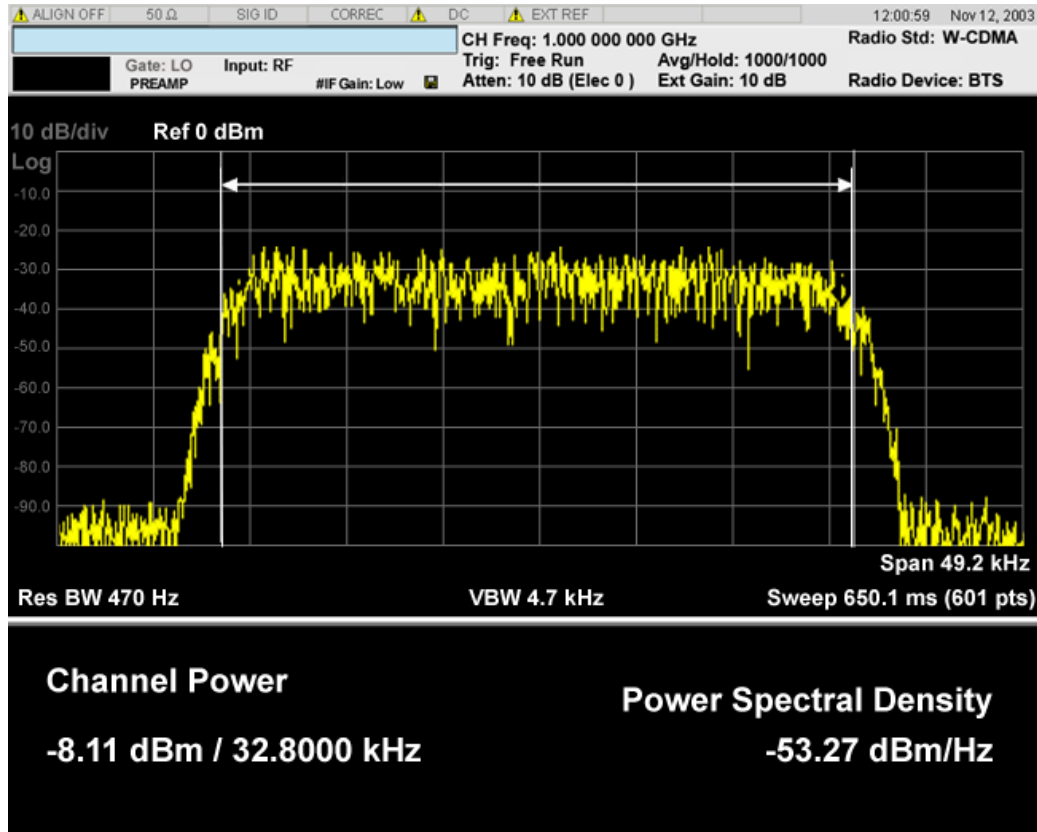
| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

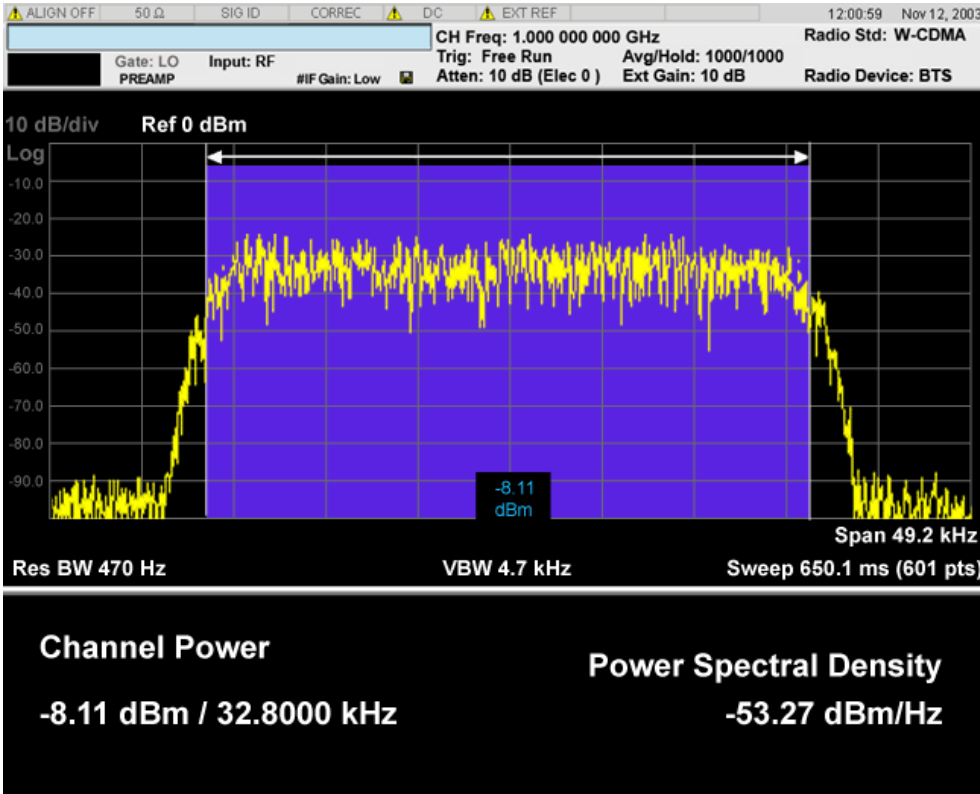
The results of the measurement can be displayed as a single spectrum trace view or displayed with a Bar Graph trace on the spectrum trace.

Spectrum View with Bar Graph off



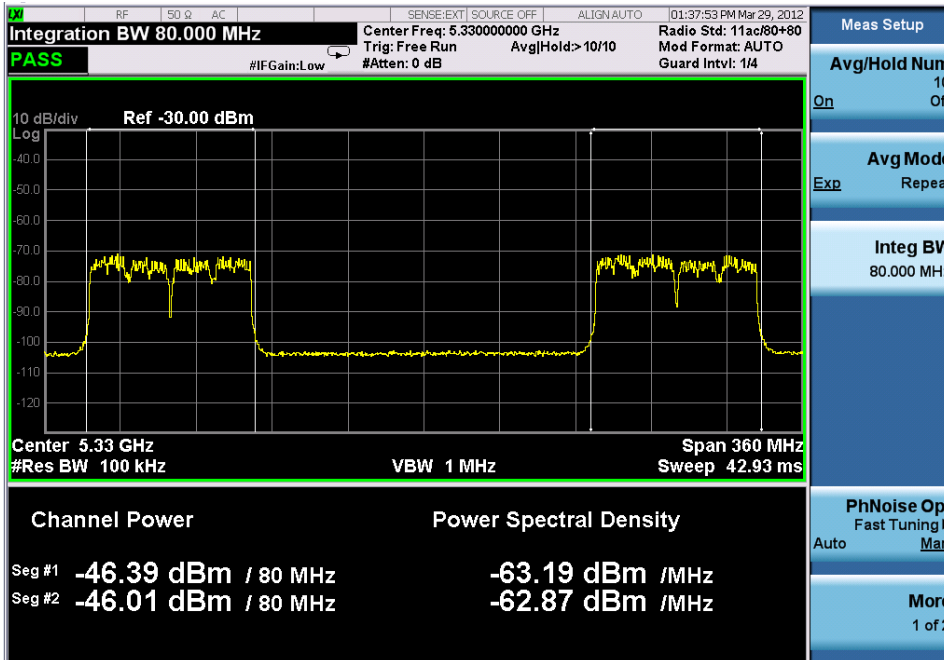
Spectrum View with Bar Graph on

This View is the same as the 'Spectrum' view, but has a blue bar between the markers that indicates the measured output power level. The bar graph is activated when the "Bar Graph" Soft Key is set to ON under the View/Display menu. The actual measured output power level is displayed on the display at the bottom of the bar.



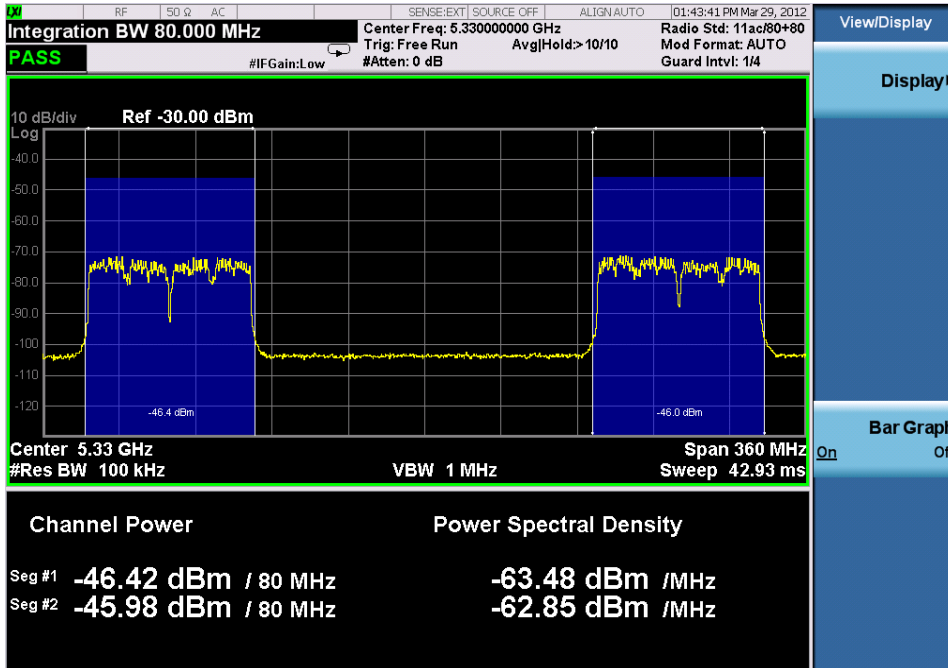
If the current mode is WLAN and the format is WLAN 802.11ac 80+80 MHz, the spectrum view is changed a little so that the results of both carrier segments can be displayed.

Spectrum View with Bar Graph off for WLAN 802.11ac (80 + 80 MHz):



Spectrum View with Bar Graph on for WLAN 802.11ac (80 + 80 MHz):

8 Channel Power Measurement View/Display



Power Results:

The spectrum trace and power bars are displayed in the upper window. Total carrier power, total PSD and total format carrier power are displayed in the lower window. Total format carrier power is total power of carriers of the same Radio Format. If there is no carrier of the corresponding format, it is not displayed. Thus items in the total format power table changes depending on the carrier configuration.

Carrier Info:

The lower window of Power Results view is replaced by the carrier info table in this view. Carrier center frequency can be displayed in either offset or absolute frequency depending on Carrier Freq. The table can be scrolled by Carrier Result on Meas Setup menu or by Select Carrier on Config Carriers menu. The highlighted row changes as either Carrier Result or Select Carrier is changed. The highlighted row and these keys are not coupled.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

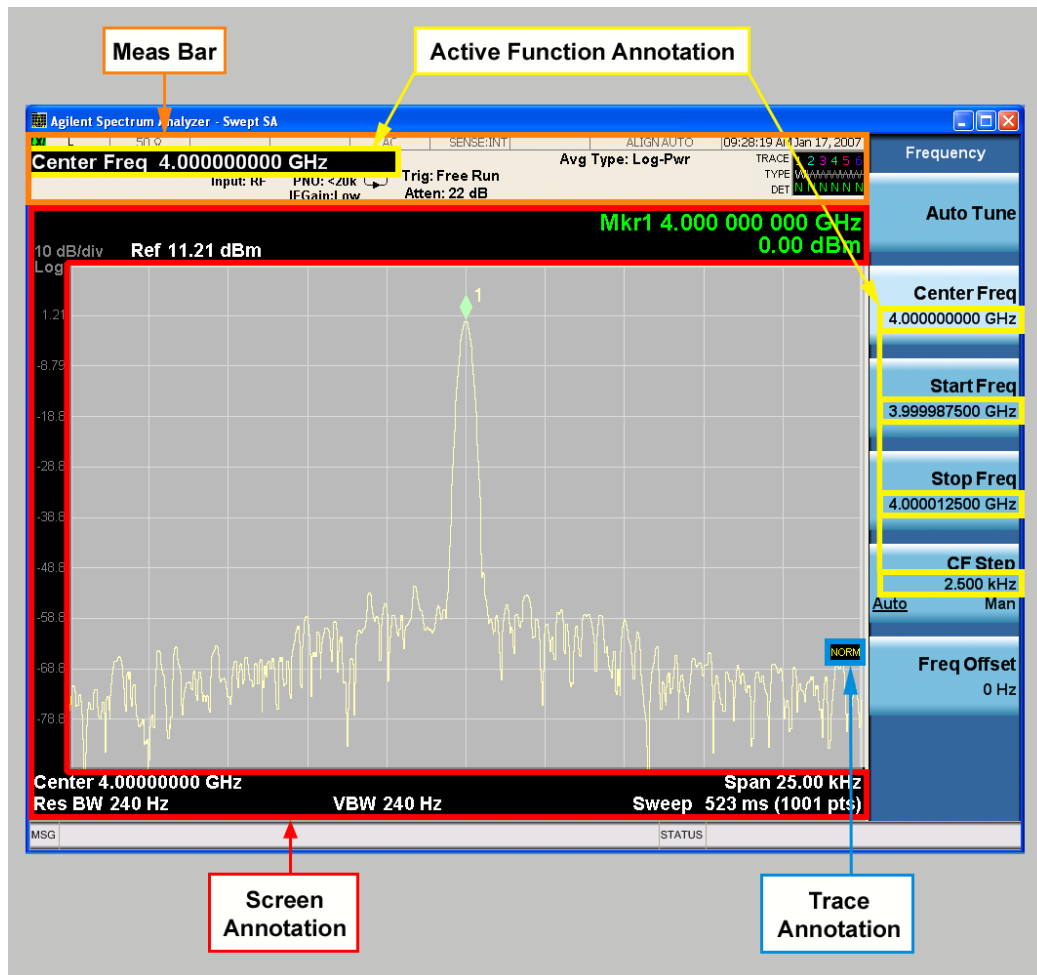
| Key Path | Display |
|----------------------|---------------------|
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|-----------------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

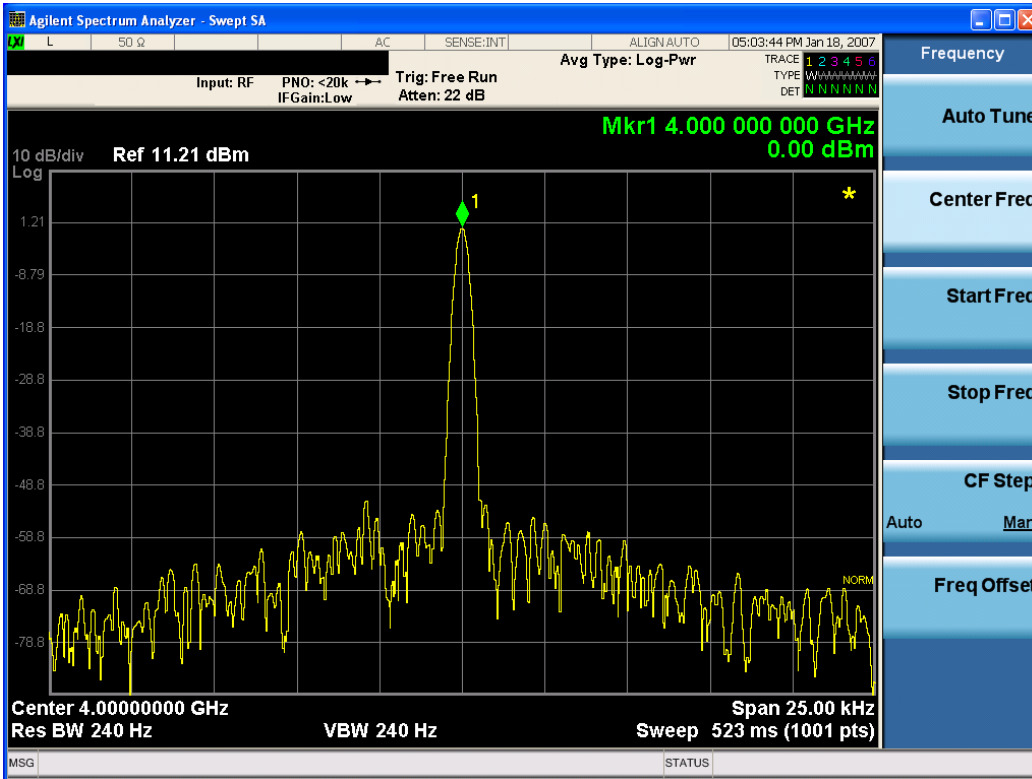
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

| | |
|-----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe]? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|-----------------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|-----------------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |

| | |
|----------------------|--|
| Notes | Uses the :DISPlay:<measurement>:ANNOtation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|-----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|-----------------------|---|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNOtation[:ALL] OFF ON 0 1 |

| | |
|-------------------------------|---|
| | :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored - all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReem:THEMe TDColor TDMonochrome FCOLor FMONochrome :MMEMory:STORe:SCReem:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Bar Graph

Turns the Bar Graph On and Off.

| | |
|-----------------------|---|
| Key Path | DVB-T/H, DTMB (CTTB), ISDB-T, CMMB: View/Display, RF SpectrumOthers: View/Display |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph ON OFF 1 0 :DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph? |
| Example | DISP:CHP:VIEW:WIND:BGR ON DISP:CHP:VIEW:WIND:BGR? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, DVB-T/H mode, DTMB (CTTB) mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD mode or WIMAX OFDMA mode to use this command. Use :INSTRument:SElect to set the mode. |

8 Channel Power Measurement
View/Display

| | |
|--------------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

9 Occupied Bandwidth Measurement

The Occupied Bandwidth measurement computes and displays the bandwidth occupied by a given percentage of the total mean power of a signal. For measurement results and views, see ["View/Display" on page 949](#).

This topic contains the following sections:

["Remote Commands for Occupied Bandwidth" on page 668](#)

["Remote Command Results for Occupied Bandwidth Measurement" on page 669](#)

Remote Commands for Occupied Bandwidth

The following commands and queries can be used to retrieve the measurement results:

```
:CONFigure:OBWidth  
:CONFigure:OBWidth:NDEFault  
:INITiate:OBWidth  
:FETCh:OBWidth[n]?  
:MEASure:OBWidth[n]?  
:READ:OBWidth[n]?  
:FETCh:OBWidth:OBWidth?  
:MEASure:OBWidth:OBWidth?  
:READ:OBWidth:OBWidth?  
:FETCh:OBWidth:FERRor?  
:MEASure:OBWidth:FERRor?  
:READ:OBWidth:FERRor?  
:FETCh:OBWidth:XDB?  
:MEASure:OBWidth:XDB?  
:READ:OBWidth:XDB?
```

See also the section, "[Remote Measurement Functions](#)" on page 2430.

Remote Command Results for Occupied Bandwidth Measurement

The following table describes the results returned by the FETCh:OBWidth[n]?, MEASure:OBWidth[n]?, and READ:OBWidth[n]? queries listed above, according to the index value n.

| n | Results Returned |
|------------------------|--|
| n=1 (or not specified) | Returns 7 scalar results, in the following order: <ol style="list-style-type: none"> 1. Occupied bandwidth - Hz 2. Total Power or OBW Power - dBm (Power reference type can be changed with the Power Ref key in Meas Setup. Total Power will be obsolete in TD-SCDMA mode, this place will be replaced by NaN) 3. Span - Hz 4. Spectrum Trace Points - points 5. Res BW - Hz 6. Transmit Frequency Error Hz 7. x DB Bandwidth - Hz |
| 2 | Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured. |
| | Returns number of active carriers within Span in Auto detected mode, otherwise the command is out of scope. |
| 4 | Returns OBW Boundaries table results in the following order: <ol style="list-style-type: none"> 1. Occupied bandwidth - Hz 2. Total Power or OBW Power - dBm (Power reference type is changed with Power Ref key in Meas Setup. Total Power will be obsolete in TD-SCDMA mode, this place will be replaced by NaN) 3. x dB Reference Power - dBm 4. x dB Reference Power Frequency - offset frequency [Hz] 5. x dB Reference Power Frequency - absolute frequency [Hz] 6. NaN (9.91E+37) 7. NaN (9.91E+37) 8. NaN (9.91E+37) 9. Lower OBW boundary - offset frequency [Hz] 10. Lower OBW boundary - absolute frequency [Hz] 11. Lower OBW boundary - absolute power [dBm] 12. Lower OBW boundary - relative power [dBc] 13. Upper OBW boundary - offset frequency [Hz] 14. Upper OBW boundary - absolute frequency [Hz] 15. Upper OBW boundary - absolute power [dBm] 16. Upper OBW boundary - relative power [dBc] 17. Lower x dB BW boundary - offset frequency [Hz] 18. Lower x dB BW boundary - absolute frequency [Hz] 19. Lower x dB BW boundary - absolute power [dBm] 20. NaN (9.91E+37) |

| n | Results Returned |
|----------|---|
| | 21. Upper x dB BW boundary - offset frequency [Hz] |
| | 22. Upper x dB BW boundary - absolute frequency [Hz] |
| | 23. Upper x dB BW boundary - absolute power [dBm] |
| | 24. NaN (9.91E+37) |
| | The results 6, 7, 8, 20 and 24 always return NaN (9.91E+37) |

| Key Path | Meas |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.16.00 |

AMPTD Y Scale (Amplitude/Y Scale)

Activates the Reference Value function and displays the Amplitude menu keys. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis

See AMPTD Y Scale for more information.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Ref Value

Sets the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

| Key Path | AMPTD Y Scale |
|--------------------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:OBW:VIEW:WIND:TRAC:Y:RLEV 125 DISP:OBW:VIEW:WIND:TRAC:Y:RLEV? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, BLUETOOTH mode, LTE mode, LTE TDD mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dBm |
| State Saved | Saved in instrument state. |
| Min | -250.00 dBm |
| Max | 250.00 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Range

The Range menu allows setting amplitude controls of the instrument.

| Key Path | AMPTD Y Scale |
|----------|---------------|
|----------|---------------|

| | |
|----------------------|-------------|
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|----------------------|---|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|--|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first

measurement.

| | |
|---------------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSE] :POWER [:RF] :RANGE :OPTimize :ATTenuation OFF ON ELEctrical COMBined</code> <code>[:SENSe] :POWeR [:RF] :RANGe :OPTimize :ATTenuation?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|-----------------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after

setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|-----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real> [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet? |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div

Sets the logarithmic units per vertical graticule division on the display. When the Auto Scaling is On, the Scale/Div is automatically determined by the measurement result. When you set a value manually, Auto Scaling is automatically toggled to Off.

| | |
|--------------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTE TDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision? |
| Example | DISP:OBW:VIEW:WIND:TRAC:Y:PDIV 5 DISP:OBW:VIEW:WIND:TRAC:Y:PDIV? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dB |
| State Saved | Saved in instrument state. |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

| Key Path | AMPTD Y Scale |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTER BOTTom :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | DISP:OBW:VIEW:WIND:TRAC:Y:RPOS BOTT DISP:OBW:VIEW:WIND:TRAC:Y:RPOS? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTRument:SElect to set the mode. |
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

| Key Path | AMPTD Y Scale |
|----------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | DISP:OBW:VIEW:WIND:TRAC:Y:COUP ON DISP:OBW:VIEW:WIND:TRAC:Y:COUP? |
| Couplings | When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically sets the scale per division to 10 dB and determines reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | 1 |
| State Saved | Saved in instrument state. |
| Range | On Off |

9 Occupied Bandwidth Measurement
AMPTD Y Scale (Amplitude/Y Scale)

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 677

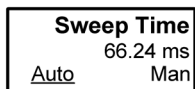
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPle ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.

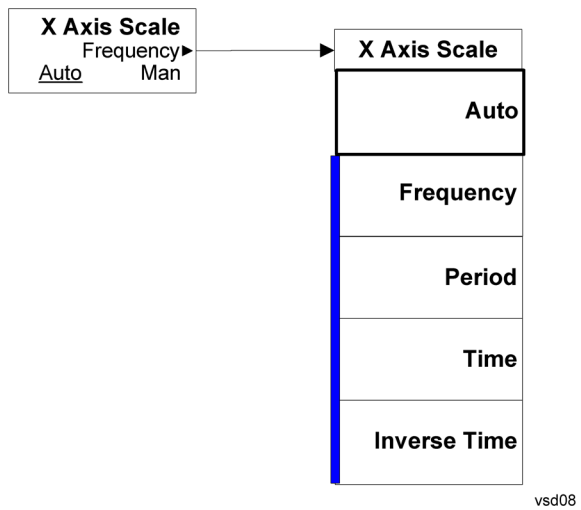


vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.

9 Occupied Bandwidth Measurement
Auto Couple



BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Res BW

Sets the resolution bandwidth for the current measurement. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

| | |
|-----------------------|--|
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:OBWidth:BANDwidth[:RESolution] <bandwidth> [:SENSe]:OBWidth:BANDwidth[:RESolution]? [:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO ON OFF 1 0 [:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO? |
| Example | OBW:BAND 250000 OBW:BAND? OBW:BAND:AUTO OFF OBW:BAND:AUTO? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Couplings | Sweep time is coupled to RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1). When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, bandwidths are entered manually, and these bandwidths are used regardless of other analyzer settings. |
| Preset | SA: Auto WCDMA: 30 kHz CDMA2K: 12 kHz WIMAX OFDMA: 100 kHz TD-SCDMA: 30 kHz 1xEVDO: 30 kHz ISDB-T: 10 kHz |

| | |
|-------------------------------------|--|
| | CMMB: 3 kHz LTE: 30 kHz LTETDD: 30 kHz BLUETOOTH:10 kHz WLAN: 100kHz MSR: 30 kHz, LTEAFDD, LTEATDD: 30 kHz SA: ON WCDMA, C2K, TD-SCDMA, WIMAX OFDMA, 1xEVDO , ISDB-T, CMMB, LTE, LTETDD, WLAN, MSR, LTEAFDD, LTEATDD: OFF |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 8 MHz |
| Backwards Compatibility SCPI | [:SENSe] :OBWidth:BWIDth[:RESolution] |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Video BW

Changes the analyzer post-detection filter.

| | |
|-----------------------|---|
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <pre>[:SENSe] :OBWidth:BA NDwidth:VIDeo <bandwidth> [:SENSe] :OBWidth:BA NDwidth:VIDeo? [:SENSe] :OBWidth:BA NDwidth:VIDeo:AUTO ON OFF 1 0 [:SENSe] :OBWidth:BA NDwidth:VIDeo:AUTO?</pre> |
| Example | <pre>OBW:BA ND:VID 5 MHz OBW:BA ND:VID? OBW:BA ND:VID:AUTO ON OBW:BA ND:VID:AUTO?</pre> |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Dependencies | When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out). |
| Couplings | Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW. |

Sweep Time is coupled to Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually “in-circuit” when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result.

Although the VBW filter is not “in-circuit” when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace.

When the video bandwidth is AUTO coupled, the video bandwidth value is set to:

Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio

| | |
|-------------------------------------|---|
| Preset | SA, LTE, LTETDD, WLAN, MSR, LTEAFDD, LTEATDD: Auto WCDMA: 300 kHz CDMA2K:120 kHz WIMAX OFDMA: 1 MHz TD-SCDMA: 300 kHz 1xEVDO: 300 kHz ISDB-T: 300 Hz CMMB: 3 kHz BLUETOOTH: 30 kHz ON ISDB-T, CMMB: OFF |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 50 MHz |
| Backwards Compatibility SCPI | [:SENSe] :OBWidth :BWIDth :VIDeo |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Filter Type

Allows you to select the type of filter to be used for the current measurement. Besides the Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

| | |
|----------------|--|
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth :BANDwidth :SHAPE GAUSSian FLATtop [:SENSe] :OBWidth :BANDwidth :SHAPE? |
| Example | OBW:BAND:SHAP GAUS |

9 Occupied Bandwidth Measurement
BW

| | |
|---|----------------------------------|
| | OBW:BAND:SHAP? |
| Preset | GAUSSian |
| State Saved | Saved in instrument state. |
| Range | Gaussian Flattop |
| Backwards Compatibility SCPI | [:SENSe] :OBWidth:BWIDth:SHAPE |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

9 Occupied Bandwidth Measurement
Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 689](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 691](#)

See ["Center Frequency Presets" on page 687](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 687 and "RF Center Freq" on page 689 and Ext Mix Center Freq and "I/Q Center Freq" on page 691. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 687 and "RF Center Freq" on page 689 and "I/Q Center Freq" on page 691. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 687 and "RF Center Freq" on page 689 and "I/Q Center Freq" on page 691. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

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FREQ Channel

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:RF:CENTer <freq> [:SENSe] :FREQuency:RF:CENTer? |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENt 60 GHz</code> <code>:FREQ:EMIX:CENt?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table ($\text{Span} = \text{Stop Freq} - \text{Start Freq}$), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|-----------------------|--|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP [:INCRe ment] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500 MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO? |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | Span, RBW, Center frequency If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | Auto ADEM0D: 1 MHz ON |
| State Saved | Saved in instrument state |
| Min | - (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Input/Output

See ["Input/Output" on page 162](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays the menu keys that enable you to select, set up and control the markers for the current measurement

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|---------------------------|
| Key Path | Marker, Properties |
| Initial S/W Revision | Prior to A.02.00 |

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. If the selected marker is Off, pressing Marker sets it to Normal and places a single marker at the center of the display. At the same time, **Marker X Axis Value** appears on the Active Function area.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:MODE POSition DELTa OFF :CALCulate:OBWidth:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:OBW:MARK:MODE POS CALC:OBW:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. |

| | |
|--------------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Properties

Accesses the marker properties menu.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays the menu keys that enable you to select, set up and control the markers for the current measurement

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|---------------------------|
| Key Path | Marker, Properties |
| Initial S/W Revision | Prior to A.02.00 |

Relative To

Selects the desired marker. The selected marker will be relative to its reference marker.

| | |
|----------------|--|
| Key Path | Marker, Properties |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:OBWidth:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:OBW:MARK:REF 2 |

| | |
|--------------------------|--|
| | CALC:OBW:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried a single value is returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis mode, WCDMA mode, TD-SCDMA mode, 1xEVDO mode, WIMAX OFDMA mode ISDB-T mode, WLAN mode, CMMB mode, LTE mode, LTETDD mode or BLUETOOTH mode to use this command. Use:INSTrument:SElect to set the mode. |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 12 |
| Readback | Current selected relative to marker number. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

All Markers Off

Turns off all markers.

| | |
|--------------------------|--|
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer:AOff |
| Example | CALC:OBW:MARK:AOff |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off.

| | |
|----------------|--|
| Key Path | SCPI only |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:X <freq> :CALCulate:OBWidth:MARKer[1] 2 ... 12:X? |
| Example | CALC:OBW:MARK3:X 0 CALC:OBW:MARK3:X? |
| Notes | The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from |

| | |
|--------------------------|---|
| | the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency . |
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**.

| | |
|--------------------------|--|
| Key Path | SCPI only |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:X:POSition <real> :CALCulate:OBWidth:MARKer[1] 2 ... 12:X:POSition? |
| Example | CALC:OBW:MARK10:X:POS 0 CALC:OBW:MARK10:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points if the control mode is Delta . |
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

| | |
|----------------|--|
| Key Path | SCPI only |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:Y? |

| | |
|--------------------------|--|
| Example | CALC:OBW:MARK11:Y? |
| Preset | Result dependent on Markers setup and signal source. |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in **Normal** mode and places it at the center of the screen.

| | |
|--------------------------|--|
| Key Path | SCPI only |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:STATe OFF ON 0 1 :CALCulate:OBWidth:MARKer[1] 2 ... 12:STATe? |
| Example | CALC:OBW:MARK3:STAT ON CALC:OBW:MARK3:STAT? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker Function

There are no 'Marker Functions' supported in this measurement. When pressed, this key displays a blank menu.

| | |
|----------------------|------------------------|
| Key Path | Front panel key |
| Initial S/W Revision | Prior to A.02.00 |

Marker To

There is no 'Marker To' functionality supported in this measurement. When pressed, this key displays a blank menu.

| Key Path | Front panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 2431

"Current Measurement Query (Remote Command Only)" on page 2433

"Limit Test Current Results (Remote Command Only)" on page 2433

"Data Query (Remote Command Only)" on page 2433

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 2434

"Calculate Peaks of Trace Data (Remote Command Only)" on page 2439

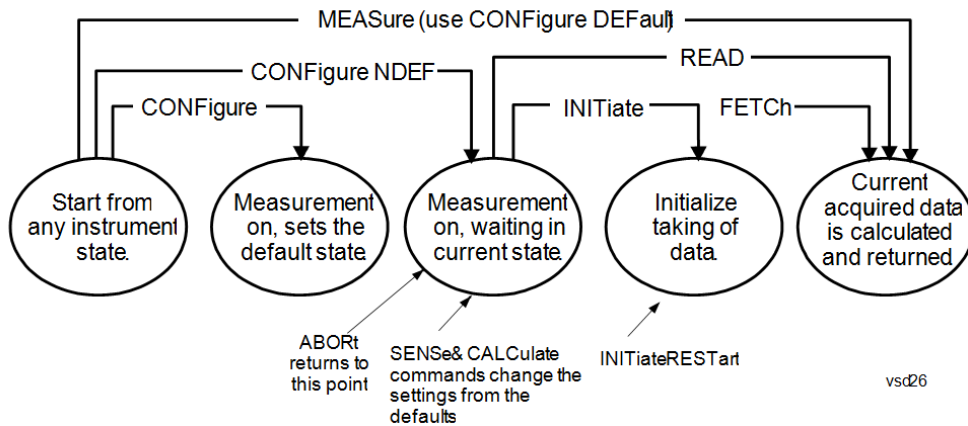
"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 2440

"Format Data: Numeric Data (Remote Command Only)" on page 2454

"Format Data: Byte Order (Remote Command Only)" on page 2455

| | |
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| Initial S/W Revision | Prior to A.02.00 |
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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
- For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
- Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
- If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
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Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
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Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

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|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

NOTE If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

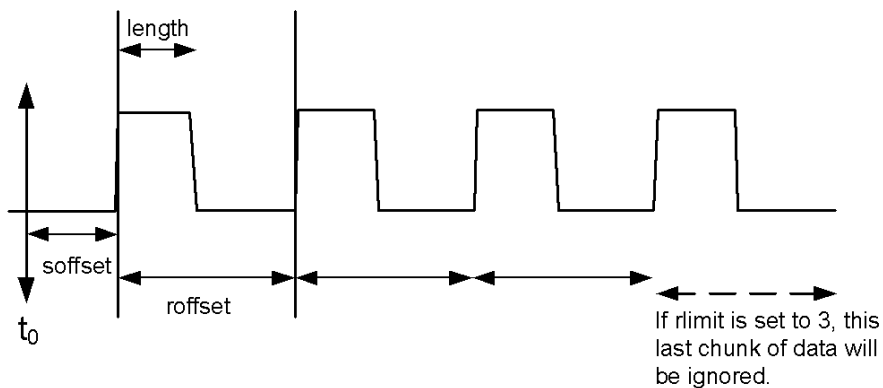
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

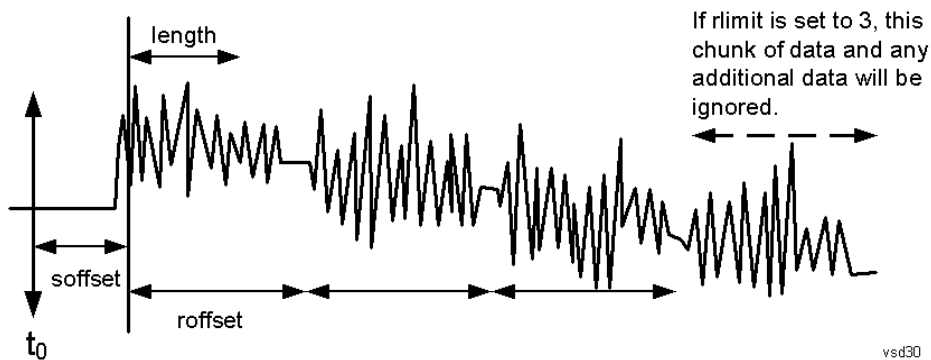
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|--|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
|-----------------------|--|

| | |
|----------------|---|
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
|----------------|---|

| | |
|--------------|---|
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

| | |
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| Initial S/W Revision | Prior to A.02.00 |
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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|----------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 – 24 dB (1 dB steps) |

| | |
|----------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 – 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1 e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

M All
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R :CALCulate:FPOWER:POWer[1,2,...,999]:DEFine?
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E :CALC:FPOW:POW1:DEF?

```

```

x
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-----
N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,
e,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDer NORMal SWAPped :FORMat:BORDer? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Displays the setup menu for the current measurement. The measurement setup parameters include the number of measurement averages used to calculate the measurement result and the averaging mode. The setup menu also includes the option to reset the measurement settings to their factory defaults.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Avg/Hold Num

Specifies the number of measurement averages used when calculating the measurement result. The average is displayed at the end of each sweep.

Initiates an averaging routine that averages the sweep points in a number of successive sweeps, resulting in trace smoothing.

After the specified number of average counts, the average mode (termination control) setting determines the average action.

| | |
|-----------------------|---|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:OBWidth:AVERage:COUNT <integer> [:SENSe]:OBWidth:AVERage:COUNT? [:SENSe]:OBWidth:AVERage[:STATe] ON OFF 1 0 [:SENSe]:OBWidth:AVERage[:STATe]? |
| Example | OBW:AVER:COUN 1500 OBW:AVER:COUN? OBW:AVER ON OBW:AVER? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTRument:SElect to set the mode. |
| Couplings | None Averaging state is coupled to Max Hold. If Max Hold is changed from Off to On, Averaging state is automatically set to On. |
| Preset | 10 ON |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |

| | |
|-------------------------------------|--|
| Backwards Compatibility SCPI | <code>[:SENSe] :EBWidth:AVERage:COUnT</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Avg Mode

Enables you to set the averaging mode.

- When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.
- When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

| | |
|--------------------------|--|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA , 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :OBWidth:AVERage:TCONtrol EXPonential REPeat</code> <code>[:SENSe] :OBWidth:AVERage:TCONtrol?</code> |
| Example | OBW:AVER:TCON REP OBW:AVER:TCON? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SELEct to set the mode. |
| Preset | EXP |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Occ BW % Pwr

Assigns the percentage of the total power that is measured within the Occupied Bandwidth for the current measurement. The resulting Occupied Bandwidth limits are displayed by markers placed on the frequencies of the specified percentage.

| | |
|-----------------------|--|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :OBWidth:PERCent <real></code> |

| | |
|--------------------------|---|
| | <code>[:SENSe] :OBWidth:PERCent?</code> |
| Example | OBW:PERC 75 OBW:PERC? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTRument:SElect to set the mode. If Mode is BLUETOOTH, the key will be grayed out. |
| Preset | 99.00 |
| State Saved | Saved in instrument state. |
| Min | 10 |
| Max | 99.99 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

x dB

Sets the x dB value used for the "x dB bandwidth" result that measures the bandwidth between two points on the signal which is x dB down from the highest signal point within the OBW Span.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTE TDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :OBWidth:XDB <rel_ampl></code> <code>[:SENSe] :OBWidth:XDB?</code> |
| Example | OBW:XDB -20 OBW:XDB? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTRument:SElect to set the mode. |
| Preset | -26.0 dB BLUETOOTH: -20.0 dB. |
| State Saved | Saved in instrument state. |
| Min | -100.0 dB |
| Max | -0.1 dB |
| Backwards Compatibility SCPI | <code>[:SENSe] :EBWidth:XDB</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Limit (for all modes except MSR and LTE-Advanced FDD/TDD)

Enables you to turn on or off limit checking at the specified frequency. For results that fail the limit test, a red FAIL appears in the measure bar.

| Key Path | Meas Setup |
|----------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN |
| Remote Command | :CALCulate:OBWidth:LIMit:FBLimit <freq> :CALCulate:OBWidth:LIMit:FBLimit? :CALCulate:OBWidth:LIMit[:TEST] ON OFF 1 0 :CALCulate:OBWidth:LIMit[:TEST]? |
| Example | CALC:OBW:LIM:FBL 50 kHz CALC:OBW:LIM:FBL? CALC:OBW:LIM OFF CALC:OBW:LIM? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Preset | SA, WCDMA: 5 MHz C2K: 1.48 MHz WIMAX OFDMA: 10 MHz TD-SCDMA: 1.6 MHz 1xEVDO: 1.48 MHz ISDB-T: 5.7 MHz CMMB: 7.512 MHz LTE, LTETDD: 5 MHz BLUETOOTH: 1 MHz WLAN: If Radio Std is 802.11a/g(OFDM/DSSS-OFDM): 20MHz If Radio Std is 802.11b: 25 MHz If Radio Std is 802.11n(20MHz): 20 MHz If Radio Std is 802.11n(40MHz): 40 MHz If Radio Std is 802.11ac(20MHz): 20 MHz If Radio Std is 802.11ac(40MHz): 40 MHz If Radio Std is 802.11ac(80MHz): 80 MHz If Radio Std is 802.11ac(160MHz): 160 MHz If Radio Std is 802.11ah(1MHz): 1 MHz If Radio Std is 802.11ah(2MHz): 2 MHz If Radio Std is 802.11ah(4MHz): 4 MHz If Radio Std is 802.11ah(8MHz): 8 MHz |

| | |
|--------------------------|---|
| | If Radio Std is 802.11ah(16MHz): 16 MHz If Radio Std is 802.11j/p(10MHz): 10 MHz If Radio Std is 802.11j/p(5MHz): 5 MHz SA: OFF WCDMA, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD: ON |
| State Saved | Saved in instrument state. |
| Min | 1 kHz |
| Max | Depends on instrument maximum frequency. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Meas Preset

Restores all measurement parameters to their default values.

| | |
|--------------------------|--|
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CONFigure:OBWidth |
| Example | CONF:OBW |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Max Hold (Remote Command Only)

When On, Max Hold displays and holds the maximum responses of the current measurement. Turn Max Hold to Off to disable the maximum hold feature.

| | |
|-----------------------|--|
| Key Path | SCPI Only |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth:MAXHold ON OFF 1 0 [:SENSe] :OBWidth:MAXHold? |
| Example | OBW:MAXH ON OBW:MAXH? |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, 1xEVDO mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Couplings | Max Hold is coupled to Average/Hold state. The Max Hold function is activated only if Average state |

| | |
|---|--|
| | is On. If Max Hold is changed to On when Average state is Off, Average state is automatically set to On. |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EBWidth:MAXHold |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Mode

See "Mode" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 735 for more information.

| | |
|--------------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST : PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPlE ALL | Auto Couple front-panel key |
| Meas Preset | :CONFIgure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTRument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODEs | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPut | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGn | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

9 Occupied Bandwidth Measurement
Mode Preset

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing **Peak Search** with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

| | |
|---------------------------------|--|
| Key Path | Front panel key |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:OBWidth:MARKer[1] 2 ... 12:MAXimum |
| Example | CALC:OBW:MARK2:MAX |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Print

See "Print " on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode’s settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled State Register <register number>” is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 744.

| Key Path | Recall |
|-----------------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

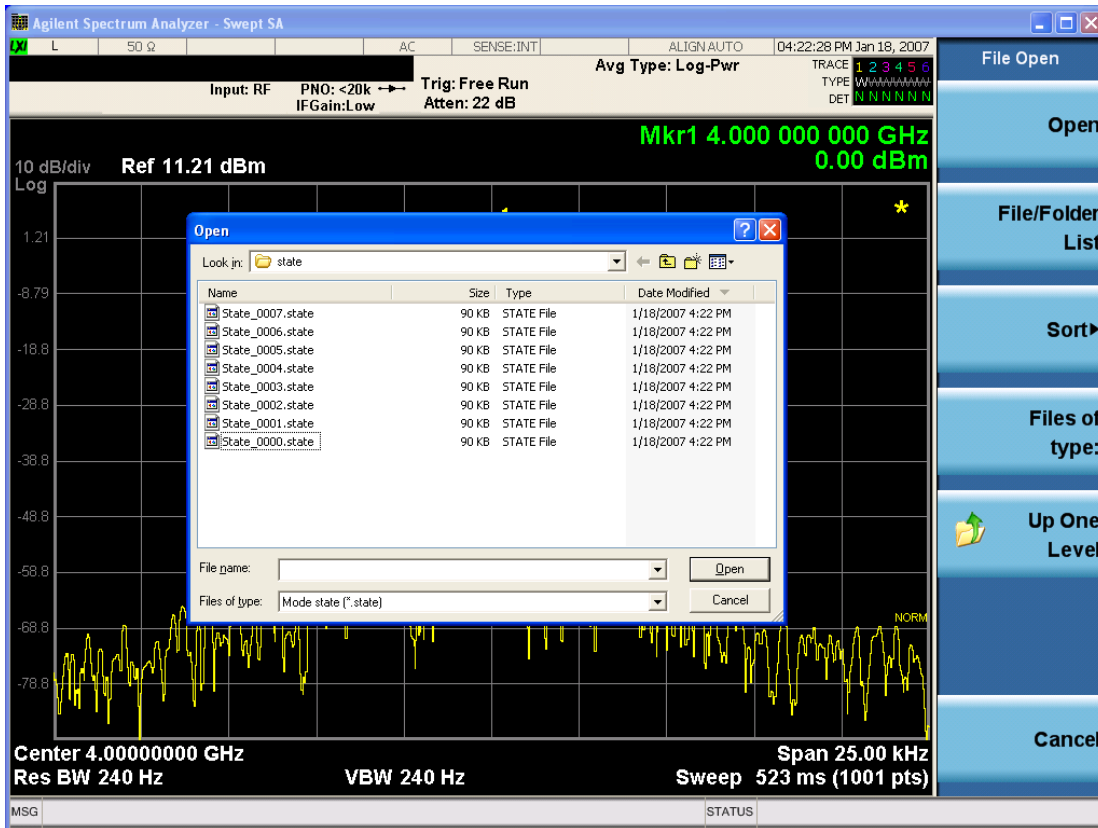
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|--|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|----------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that **"My Documents"** is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMoRY:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 752

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|-----------------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

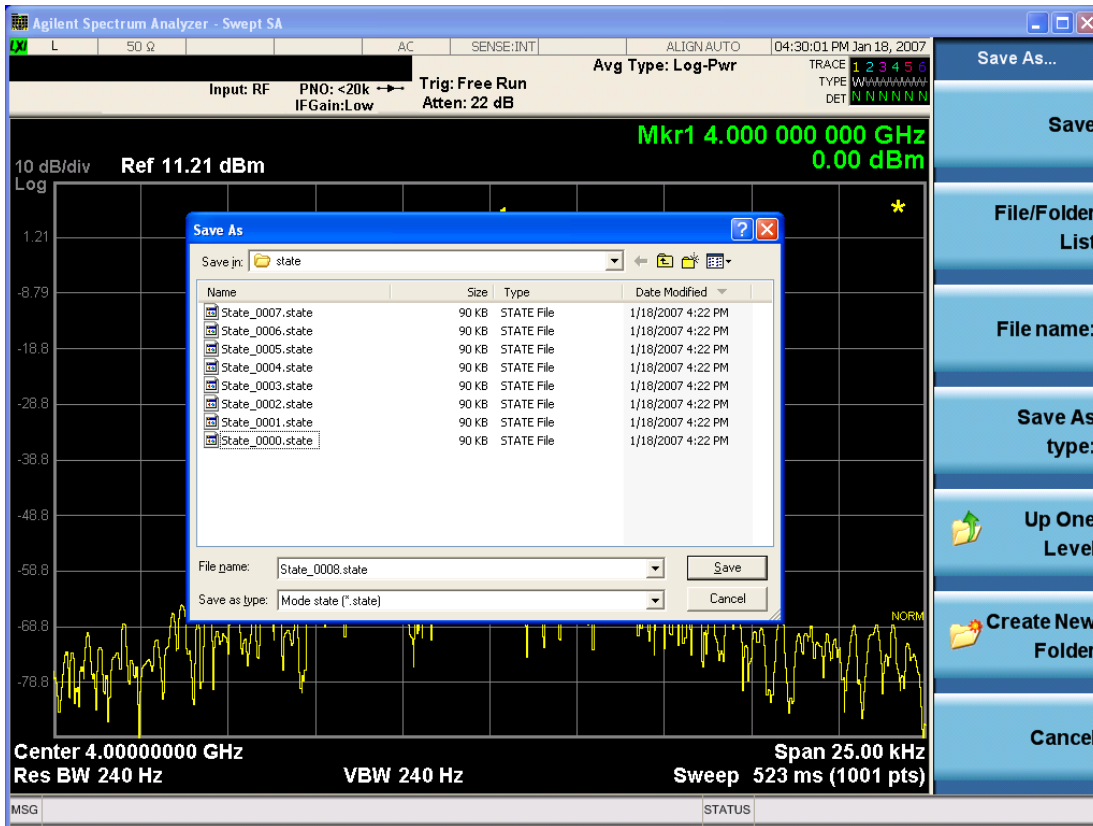
| | |
|-----------------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMoRY:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See "[More Information](#)" on page 757

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|----------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|----------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|----------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | <code>:MMEMory:RDIRECTory <directory_name></code> |
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|-----------------------|---|
| Key Path | Save, Sequences |
| Mode | All |
| Remote Command | <code>:MMEM:STOR:SEQUences: SLIST ALIST SAAList SSTep "MySequence.txt"</code> |
| Example | <code>:MMEM:STOR:SEQ:SLIST "MySequence.txt"</code> |
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none">-CSV (Comma delimited) (*.csv)-Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|----------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "To File . . ." on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\`<mode name>`\data\traces

For all of the Limit Data Files:

My Documents\`<mode name>`\data\limits

For all of the Measurement Results Data Files:

My Documents\`<mode name>`\data\`<measurement name>`\results

For all of the Capture Buffer Data Files:

My Documents\`<mode name>`\data\captureBuffer

| | |
|----------------------|---|
| Key Path | Save, Data |
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <code><mode specific></code> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

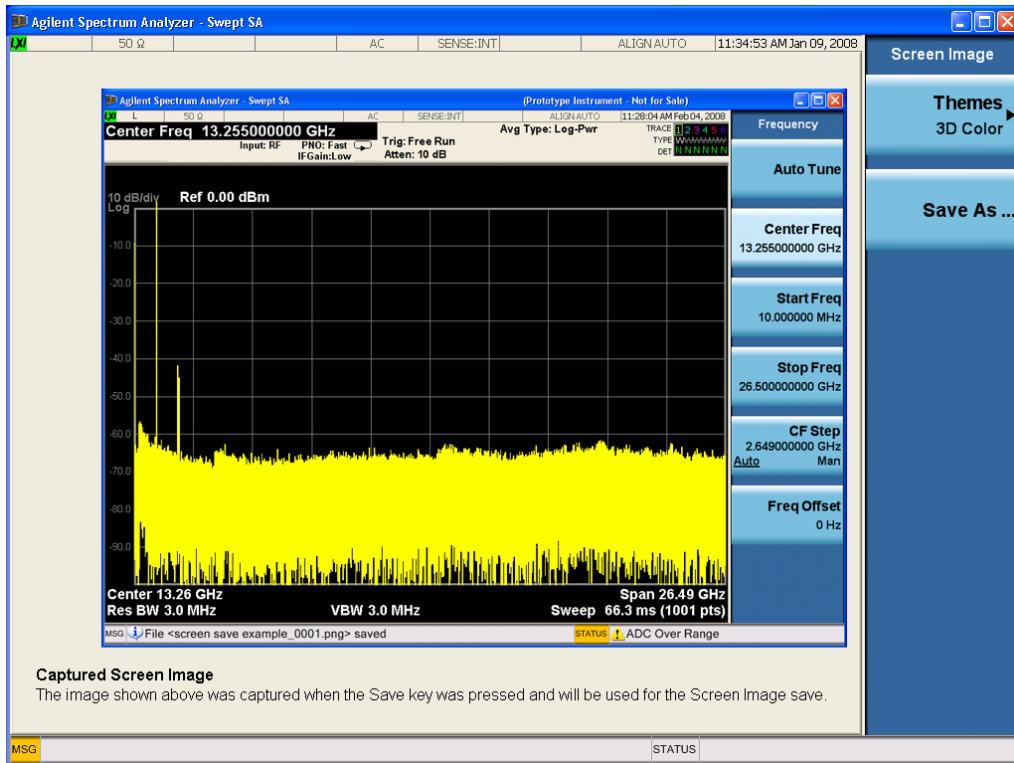
Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:

9 Occupied Bandwidth Measurement

Save



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReEn:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReEn:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\<<mode name>\screen.

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 769

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------|---|
| Remote Command | :OUTPut[:EXTErnal][:STATe] ON OFF 1 0 :OUTPut[:EXTErnal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|----------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 772](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 772 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 772 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| | |
|----------------------|---|
| Key Path | Source, Amplitude |
| Dependencies | This key is unavailable, and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 776](#),

"W-CDMA Channel Number Ranges" on page 777, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 778, and "LTE FDD Channel Number Ranges" on page 780.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|----------------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| Band IX | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| Band X | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| | | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | Downlink | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| Band XI | Uplink | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| | | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Downlink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| | | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| Band XII | Uplink | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| Band XIII | Uplink | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| Band XIV | Uplink | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | Downlink | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| | | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| Band XIX | Uplink | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | Downlink | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |
| | | | |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 * N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | 2110 | 2110 | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | 1930 | 1930 | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | 1805 | 1805 | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | 2110 | 2110 | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | 869 | 869 | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | 875 | 875 | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | 2620 | 2620 | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | 925 | 925 | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | 1844.9 | 1844.9 | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | 2110 | 2110 | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | 1475.9 | 1475.9 | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | 729 | 729 | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | 746 | 746 | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | 758 | 758 | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | 734 | 734 | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | 860 | 860 | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 – 6149 | 830 | 24000 | 24000 – 24149 |
| 20 | 791 | 6150 | 6150 – 6449 | 832 | 24150 | 24150 – 24449 |
| 21 | 1495.9 | 6450 | 6450 – 6599 | 1447.9 | 24450 | 24450 – 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 – 8039 | 1626.5 | 25700 | 25700 – 26039 |
| 25 | 1930 | 8040 | 8040 – 8689 | 1850 | 26040 | 26040 – 26689 |
| 26 | 859 | 8690 | 8690 – 9039 | 814 | 26690 | 26690 – 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 – 36199 | 1900 | 36000 | 36000 – 36199 |
| 34 | 2010 | 36200 | 36200 – 36349 | 2010 | 36200 | 36200 – 36349 |
| 35 | 1850 | 36350 | 36350 – 36949 | 1850 | 36350 | 36350 – 36949 |
| 36 | 1930 | 36950 | 36950 – 37549 | 1930 | 36950 | 36950 – 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|---------------|
| 37 | 1910 | 37550 | 37550 - 37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 - 38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 - 38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 - 39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900-1920 MHz | 9504 to 9596 |
| | 2010-2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850-1910 MHz | 9254 to 9546 |
| | 1930-1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910-1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570-2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300-2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880-1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|----------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|--|
| | <p><integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"</p> |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540](#).

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command `:SOURce:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...`

(For additional description of each item, see Notes below ["For Setup SCPI" on page 834](#) "For Setup SCPI".)

`:SOURce:RADio:ARB:SEQuence[:MWAveform]? <filename>`

(For additional description of each item, see Notes ["For Query SCPI" on page 835](#) below.)

Example For setup:

`>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3`

Or

`>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1 M3`

For query, must specify which waveform sequence file to query.

`>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"`

Or

`>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",`

Notes For Setup SCPI

For the Setup SCPI command, the parameters are:

`<filename>` - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

`<waveform1>` - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1. wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
If the waveform sequence file name is empty, an error is generated.
If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
|----------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
|----------|--|

| | |
|--------------|---|
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
|--------------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|----------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|--|
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int> |
| Example | SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Dependencies | This key is only available if the currently selected slot is in the trial state or the lock required state. |
| Initial S/W Revision | A.05.00 |

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

| | |
|----------------|--|
| Remote Command | :SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int> |
| Example | :SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked" |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an |

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"> |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|-----------------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURCE:LIST:NUMBER:STEPS <integer> :SOURCE:LIST:NUMBER:STEPS? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTernal EXTernal2 KEY BUS EXTernal4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTernal4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:DEFault:DIRectory <string>
 :SOURce:RADio:ARB: DEFault:DIRectory?

Example :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"
 :SOUR:RAD:ARB:DEF:DIR?

State Saved Persistent, survives a power cycle and a preset but not saved in the instrument state

Initial S/W Revision A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as "[Delete Segment From ARB Mem](#)" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as "[Delete All From ARB Memory](#)" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 μs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMediate INTernal KEY BUS EXTernal2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|----------|---|
| R | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... |
| e | :SOURce:LIST:SETup:RADio:BAND? |
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| n | |
| d | |
| E | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM |
| X | :SOUR:LIST:SET:RAD:BAND? |
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e

N The command is to setup below parameter array of whole list sequence.

O Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 2591](#).

t If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on
e page 2587](#).

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFfrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFfrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|--|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTInuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
:SOURce:LIST:SETup:TOCount?

Example :SOUR:LIST:SET:TOC 1s,2s,3s
:SOUR:LIST:SET:TOC?
:SOUR:LIST:SET:TOC 5,6,7
:SOUR:LIST:SET:TOC?

Notes The command is to setup below parameter array of whole list sequence.
Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 2616](#) and ["Play Count" on page 2617](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
If current ["Step Duration" on page 2616](#) is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"

Dependencies The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
:SOURce:LIST:SETup:OUTPut:TRIGger ?

Example :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON
:SOUR:LIST:SET:OUTP:TRIG?

Notes The command is to setup below parameter array of whole list sequence.
Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 2618](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
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| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

Span X Scale

Activates the Span function and displays the menu of span functions. The parameter values are measurement independent.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Span

Set the frequency of the occupied bandwidth span for the current measurement.

| | |
|-----------------------|---|
| Key Path | Span X Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth:FREQuency:SPAN <freq> [:SENSe] :OBWidth:FREQuency:SPAN? [:SENSe] :OBWidth:FREQuency:SPAN:AUTO ON OFF 0 1 [:SENSe] :OBWidth:FREQuency:SPAN:AUTO? |
| Example | OBW:FREQ:SPAN 2.4 MHz OBW:FREQ:SPAN? OBW:FREQ:SPAN:AUTO 0 OBW:FREQ:SPAN:AUTO? |
| Notes | Span Auto Detector ([:SENSe] :OBWidth:FREQuency:SPAN:AUTO) is only available in MSR and LTE-Advanced FDD/TDD mode. The BAF SCPI is MSR and LTE-Advanced FDD/TDD only. |
| Couplings | When changing the Occupied Bandwidth Span, the Resolution Bandwidth and Video Bandwidth are set to AUTO to prevent the span from clipping. This is only available in MSR and LTE-Advanced FDD/TDD mode. |
| Preset | SA: 3 MHz WCDMA: 10 MHz WIMAX OFDMA: 20 MHz CDMA2K: 2 MHz TD-SCDMA: 4.8 MHz 1xEVDO: 3.75 MHz ISDB-T: 20 MHz CMMB: 8 MHz LTE, LTETDD, LTEAFDD, LTEATDD: 10 MHz BLUETOOTH:2 MHz WLAN: If Radio Std is 802.11a/g /j/p 20 MHz 802.11n(20MHz) 802.11ac(20MHz): 25 MHz If Radio Std is 802.11b: 30MHz |

| | |
|-------------------------------------|--|
| | If Radio Std is 802.11n(40MHz), 802.11ac (40MHz): 50 MHz If Radio Std is 802.11ac(80MHz): 100MHz If Radio Std is 802.11ac(160MHz): 200MHz If Radio Std is 802.11ah(1MHz): 1.25MHz If Radio Std is 802.11ah(2MHz): 2.5MHz If Radio Std is 802.11ah(4MHz): 5MHz If Radio Std is 802.11ah(8MHz): 10MHz If Radio Std is 802.11ah(16MHz): 20MHz If Radio Std is 802.11j/p(10MHz): 12.5MHz If Radio Std is 802.11j/p(5MHz): 6.25MHz MSR: 20MHz ON |
| State Saved | Saved in instrument state. |
| Min | 100 Hz |
| Max | Hardware Maximum Span |
| Backwards Compatibility SCPI | [:SENSe] :EBWidth :FREQuency :SPAN |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.10.00, A.14.00 |

Full Span

Changes the Occupied Bandwidth Span to show the full frequency range of the analyzer. When using external mixing, it changes the displayed frequency span to the frequency range specified for the selected external mixing band.

| | |
|--------------------------|---|
| Key Path | Span X Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, ISDB-T, CMMB, LTE, LTE-TDD, BLUETOOTH, WLAN, LTE-A-FDD, LTE-A-TDD |
| Remote Command | [:SENSe] :OBWidth :FREQuency :SPAN :FULL |
| Example | OBW:FREQ:SPAN:FULL |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, cdma2000 mode, MSR or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Dependencies | For MSR and LTE-Advanced FDD/TDD mode, this key is blank. In order to keep backwards compatible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application. |
| Couplings | Selecting full span changes the measurement span value. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Last Span

Changes the measurement frequency span to previous measurement span setting. If there is no existing previous span value then the span remains unchanged.

| | |
|---------------------------------|---|
| Key Path | Span X Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth:FREQuency:SPAN:PREVious |
| Example | OBW:FREQ:SPAN:PREV |
| Notes | You must be in the Spectrum Analysis mode, W-CDMA mode, ISDB-T mode, CMMB mode, LTE mode, LTE TDD mode, BLUETOOTH mode, WLAN mode, cdma2000 mode, MSR, LTE-Advanced FDD/TDD or WIMAX OFDMA mode to use this command. Use:INSTrument:SElect to set the mode. |
| Couplings | Selecting last span changes the measurement span value. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Sweep/Control

Displays a menu of functions that enable you to set up and control the time and source for the current measurement.

For details about this key, see ["Sweep/Control" on page 2634](#).

| | |
|--------------------------|---|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| <hr/> | |
| Key Path | Sweep/Control |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:OBWidth:SWEep:TIME <time> [:SENSe]:OBWidth:SWEep:TIME? [:SENSe]:OBWidth:SWEep:TIME:AUTO OFF ON 0 1 [:SENSe]:OBWidth:SWEep:TIME:AUTO? |
| Example | OBW:SWE:TIME 50 ms OBW:SWE:TIME? OBW:SWE:TIME:AUTO ON OBW:SWE:TIME:AUTO? |
| Couplings | When you manually change the Time, this state automatically goes to 'Man'. |
| Preset | SA, WIMAX OFDMA, C2K, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD: Automatically Calculated WCDMA: 32.6 ms SA, WIMAX OFDMA, C2K, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, WLAN, MSR, LTEAFDD, LTEATDD: ON WCDMA: OFF |
| State Saved | Saved in instrument state. |
| Max | 4000 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Sweep Setup

Accesses the sweep setup settings for the current measurement.

| | |
|----------------------|----------------------|
| Key Path | Sweep/Control |
| Initial S/W Revision | Prior to A.02.00 |

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting Auto Sweep Time to Accy results in slower sweep times, usually about three times as long, but better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when Auto Sweep Time is set to Accy.

Additional amplitude errors which occur when Auto Sweep Time is set to Norm are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, Norm is the preferred setting of Auto Sweep Time. Auto Sweep Time is set to Norm on a Preset or Auto Couple. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

| Key Path | Sweep/Control, Sweep Setup |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth :SWEep :TIME :AUTO :RULes NORMal ACCuracy [:SENSe] :OBWidth :SWEep :TIME :AUTO :RULes? |
| Example | OBW:SWE:TIME:AUTO:RUL NORM OBW:SWE:TIME:AUTO:RUL? |
| Notes | Set to Norm when Auto Couple is pressed or sent remotely. |
| Preset | NORMal |
| State Saved | Saved in instrument state. |
| Range | Norm Accy |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pause

Pauses the measurement after the current data acquisition is complete.

When Paused, the label on the key changes to **Resume**. Pressing **Resume** resumes the measurement at the point where it had been paused.

See "[Pause/Resume](#)" on page 2634 for more information.

| Key Path | Sweep/Control |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Gate

Accesses a menu that enables you to control the gating function. The Gate functionality is used to view signals best viewed by qualifying them with other events.

Gate setup parameters are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset.

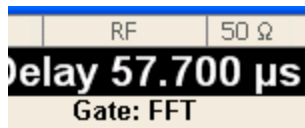
| | |
|----------------------|---|
| Key Path | Sweep/Control |
| Scope | Meas Global |
| Readback | The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT. |
| Initial S/W Revision | Prior to A.02.00 |

Gate On/Off

Turns the gate function on and off.

When the Gate Function is on, the selected Gate Method is used along with the gate settings and the signal at the gate source to control the sweep system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the measurement bar reflects that it is on and what method is used, as seen in the following "Gate: FFT" annunciator graphic.



| | |
|----------------|---|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe [:STATe] OFF ON 0 1 [:SENSe] :SWEep:EGATe [:STATe] ? |
| Example | SWE:EGAT ON SWE:EGAT? |
| Dependencies | When in the ACP measurement: <ul style="list-style-type: none"> • When Meas Method is RBW or FAST, this function is unavailable and the key is grayed out. • Whenever Gate is on, Meas Method, RBW or FAST is unavailable and keys for those are grayed out. • When Gate is on, Offset Res BW and Offset Video BW are ignored (if you set these values) and the measurement works as if all Offset Res BW and all Offset Video BW are coupled with the Res BW and the Video BW under the BW menu. When Gate is on, the Offset BW key in the Offset/Limit menu is grayed out. |
| Preset | Off LTETDD: On |
| State Saved | Saved in instrument state |

| | |
|-------------------------------------|--|
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :SWEep:TIME:GATE[:STATe] ESA compatibility |
| Backwards Compatibility Notes | In ESA, Trig Delay (On) and Gate (On) could not be active at the same time.. This dependency does not exist in PSA or in the X-Series. |
| Initial S/W Revision | Prior to A.02.00 |

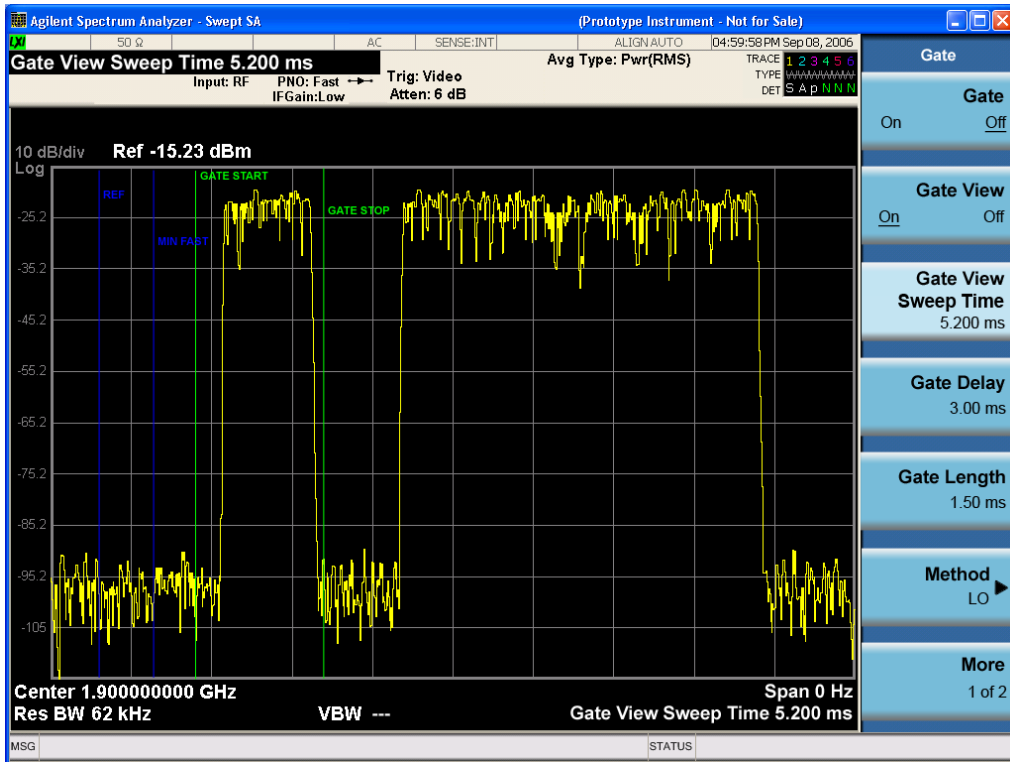
Gate View On/Off

Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

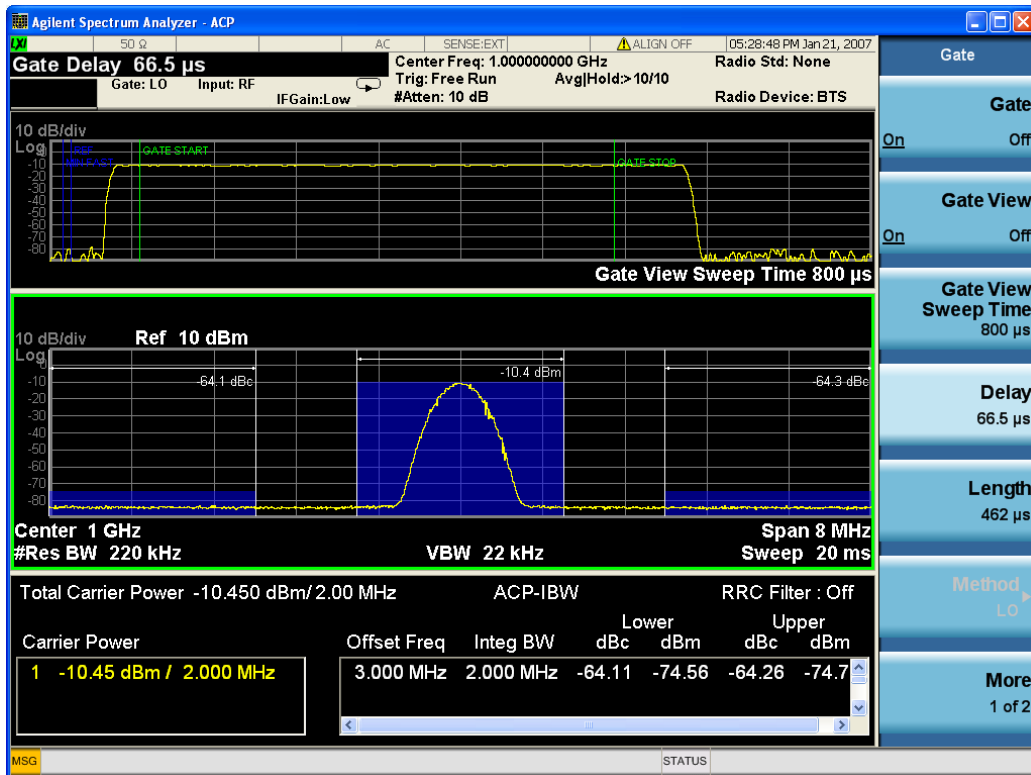
Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window, showing the positions of the Gate, is shown between the Measurement Bar and the reduced measurement window. By reducing the height of the measurement window, some of the annotation on the Data Display may not fit and is not shown.

| | |
|-----------------------------|--|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe:VIEW ON OFF 1 0 [:SENSe] :SWEep:EGATe:VIEW? |
| Example | SWE:EGAT:VIEW ON turns on the gate view. |
| Dependencies | In the Swept SA measurement: In Gate View, the regular Acq Time key is grayed out . When pressed, the grayed out key puts up the informational message "Use Gate View Sweep Time in the Gate menu." In the other measurements: When you turn Gate View on, the lower window takes on the current state of the instrument. Upon leaving Gate View, the instrument takes on the state of the lower window. When you turn Gate View on, the upper window Acquisition Time is set to the gate view acquisition time. |
| Couplings | These couplings apply to the Swept SA measurement: <ul style="list-style-type: none"> • When Gate View is turned on, the instrument is set to Zero Span. • Gate View automatically turns off whenever a Span other than Zero is selected. • Gate View automatically turns off if you press the Last Span key while in Gate View, and the instrument returns to the Span it was in before entering Gate View (even if that is Zero Span). • When Gate View is turned on, the sweep time used is the gate view sweep time. This is set according to the rules in section "Gate View Setup" on page 1246 • When Gate View is turned off, Sweep Time is set to the normal Swept SA measurement sweep time. • If Gate View is on and Gate is off, then turning on Gate turns off Gate View. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

A sample of the Gate View screen in the Swept SA measurement is shown in the following graphic :



A sample of the Gate View screen in other measurements is shown in the following graphic . This example is for the ACP measurement:



Turning Gate View off returns the analyzer to the Normal measurement view.

In the Swept SA, the normal measurement view is the single-window Swept SA view. When returning to this view, the Swept SA measurement returns to the Span it was in before entering **Gate View** (even if that is Zero Span).

The **Gate View** window is triggered from the Gate Source, with zero trigger delay. Also, when updating the **Gate View** window, the Gate itself must not operate. So it is internally shut off while the gate view window is being updated. For the Swept SA measurement, this means that the Gate is internally shut off whenever the gate view window is displayed. The measurement bar and softkeys continue to show the Trigger source for the main sweep window and give no indication that the Gate is shut off or that the Gate View window is triggered from the Gate Source.

When in **Gate View**, vertical lines are displayed in the Gate View window as follows:

- Green lines are displayed at the gate edges as follows: in Edge Gate, a line is shown for Delay and one for the end of the Gate period, defined by Length. You can adjust the position of the green lines by adjusting the gate length and the gate delay. These lines update in the Gate View window as the active function changes, even if the window is not being updated. In Gated FFT, their location is relative to the left edge of the screen.
- A blue line is displayed showing the delay reference, that is, the reference point for the Gate Delay within the Zero Span window. The blue line represents where (in time) the effective location of the gate start would be if the gate were programmed to zero delay.

Gate View Setup

Accesses a menu that enables you to setup parameters relevant to the Gate View

| | |
|----------------------|----------------------------|
| Key Path | Sweep/Control, Gate |
| Scope | Meas Global |
| Initial S/W Revision | A.10.00 |

Gate View Acquisition Time

Controls the acquisition time in the Gate View window. To provide an optimal view of the gate signal, the analyzer initializes Gate View Acq Time based on the current settings of Gate Delay and Gate Length.

| | |
|-----------------------|---|
| Key Path | Sweep/Control, Gate, Gate View Setup |
| Remote Command | [:SENSe] :SWEep:EGATe:TIME <time> [:SENSe] :SWEep:EGATe:TIME? |
| Example | SWE:EGAT:TIME 500 ms |
| Dependencies | Gate View Acquisition Time is initialized: <ul style="list-style-type: none"> • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. <ol style="list-style-type: none"> 1. Compute the location of the "gate stop" line, which you know is at time $t = t_{min} + GateDelay + GateLength$. |
| Preset | 519.3 μ s WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 6000 s |
| Initial S/W Revision | Prior to A.02.00 |

Gate View Start Time

Controls the time at the left edge of the Gate View.

| | |
|-----------------------|---|
| Key Path | Sweep/Control, Gate, Gate View Setup |
| Remote Command | [:SENSe] :SWEep:EGATe:VIEW:STARt <time> [:SENSe] :SWEep:EGATe:VIEW:STARt? |
| Example | SWE:EGAT:VIEW:STAR 10ms |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. See error -131. |

| | |
|----------------------|---------------------------|
| Preset | 0 ms |
| State Saved | Saved in instrument state |
| Min | 0 |
| Max | 500 ms |
| Initial S/W Revision | A.10.00 |

Gate Delay

Controls the length of time from the time the gate condition goes True until the gate is turned on.

| | |
|-------------------------------------|--|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe:DELay <time> [:SENSe] :SWEep:EGATe:DELay? |
| Example | SWE:EGAT:DELay 500ms SWE:EGAT:DELay? |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 57.7 us WiMAX OFDMA: 71 us GSM/EDGE: 600 us WLAN: 500 us WLAN: 36 us |
| State Saved | Saved in instrument state |
| Min | 0.0 us |
| Max | 100 s |
| Backwards Compatibility SCPI | [:SENSe] :SWEep:TIME:GATE:DELay ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Length

Controls the length of time that the gate is on after it opens.

| | |
|-----------------------|--|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe:LENGth <time> [:SENSe] :SWEep:EGATe:LENGth? |
| Example | SWE:EGAT:LENG 1 SWE:EGAT:LENG? |

| | |
|-------------------------------------|--|
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us WLAN: 1.54 ms WLAN: 32 us |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 5 s |
| Backwards Compatibility SCPI | [:SENSe] :SWEep :TIME :GATE :LENGth ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Source

The menus under the **Gate Source** key are the same as those under the **Trigger key**, with the exception that neither **Free Run** nor **Video** are available as Gate Source selections. However, a different SCPI command is used to select the Gate Source (see table below) because you may independently set the Gate Source and the Trigger Source.

Any changes to the settings in the setup menus under each Gate Source selection key (for example: Trigger Level, Trigger Delay, etc.) also affect the corresponding settings under the Trigger menu keys. The SCPI commands used for these are the same for Trigger and Gate, since there is only one setting which affects both Gate and Trigger. Example: to set the Trigger Level for External 1 you use the command :TRIG:EXT1:LEV regardless of whether you are using External 1 as a Trigger Source or a Gate Source.

| Key Path | Sweep/Control, Gate |
|--------------------------|--|
| Remote Command | [:SENSe] :SWEep :EGATE :SOURCE EXTernal1 EXTernal2 LINE FRAME RFBurst [:SENSe] :SWEep :EGATE :SOURCE? |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" error. |
| Preset | EXTernal 1 GSM/EDGE, MSR: FRAME LTETDD: EXTernal 1When Direction is Downlink, FRAME when Direction is Uplink. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE

When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

| | |
|--------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA |
| Notes | Log Plot and Spot Frequency measurements do not support Video Trigger |
| Dependencies | Video trigger is allowed in average detector mode. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

| | |
|-----------------------|--|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:LEVel <ampl> :TRIGger[:SEquence]:VIDeo:LEVel? |
| Example | TRIG:VID:LEV -40 dBm |
| Notes | When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until |

you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level.
Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.

| | |
|-------------------------------------|--|
| Couplings | This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu. |
| Preset | Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. |
| State Saved | Saved in instrument state |
| Min | -170 dBm |
| Max | +30 dBm |
| Default Unit | Depends on the current selected Y axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:IF:LEVel :TRIGger[:SEQuence]:IF:LEVel? |
| Backwards Compatibility Notes | This alias is provided for backward compatibility with VSA/PSA comms apps. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEQuence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEQuence]:VIDeo:SLOPe? |
| Example | TRIG:VID:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:IF:SLOPe NEGative POSitive :TRIGger[:SEQuence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | :TRIGger[:SEQuence]:SLOPe POSitive NEGative |
|-----------------------|---|

| | |
|-------------------------------|---|
| | :TRIGger[:SEquence]:SLOPe? |
| Example | TRIG:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source. |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|-----------------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 |

| | |
|-------------------------------------|---|
| | selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|-----------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTErnal1:DELay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTErnal1:DELay:COMPensation? |
| Example | TRIG:EXT1:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| | |
|-------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTErnal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger

events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|-----------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation? |
| Example | TRIG:EXT2:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| | |
|--------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| | |
|-------------------------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:
3. absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level
4. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_amp> :TRIGger[:SEquence]:RFBurst:LEVel:RELative? |
| Example | TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB |
| Notes | Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent. |
| Dependencies | This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering. |
| Preset | -6 dB GSM: -25 dB |
| State Saved | Saved in instrument state |
| Min | -45 dB |

| | |
|-------------------------------------|--|
| Max | 0 dB |
| Default Unit | dB or dBc |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:RFBurst:LEVel This legacy command is aliased to :TRIGger[:SEQuence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEQuence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEQuence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

| | |
|-----------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Readback | [Sync: <value of Sync Source>], for example, [Sync: External 1] |
| Status Bits/OPC | |

| | |
|----------------------|--|
| dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

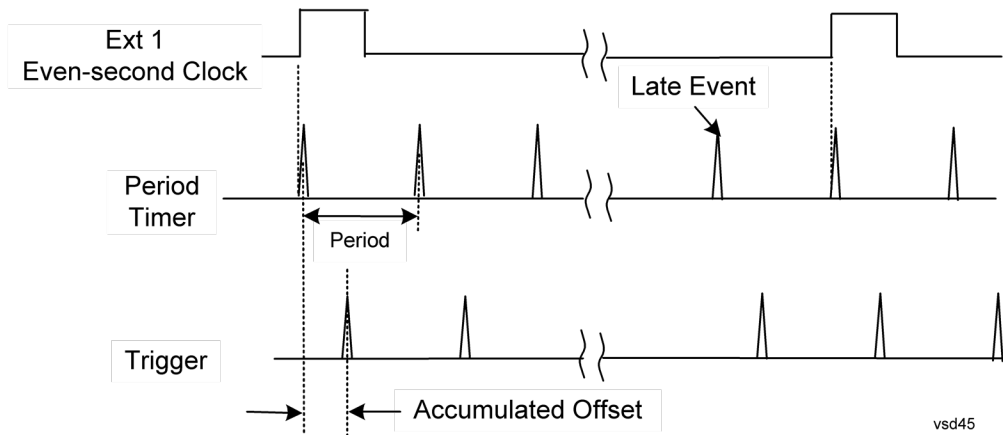
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not miss-trigger. Miss-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

| | |
|----------------------|---|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:PERiod <time> :TRIGger[:SEquence]:FRAMe:PERiod? |
| Example | TRIG:FRAM:PER 100 ms |
| Dependencies | The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes. |
| Couplings | The same period is used in the Gate Source selection of the period timer. |
| Preset | 20 ms GSM: 4.615383 |
| State Saved | Saved in instrument state |
| Min | 100.000 ns |
| Max | 559.0000 ms |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of

that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

| | |
|-----------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet <time> :TRIGger[:SEquence]:FRAMe:OFFSet? |
| Example | TRIG:FRAM:OFFS 1.2 ms |
| Notes | The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key). Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section " Trig Delay " on page 365 . An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event. |
| Notes | When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. The SCPI query simply returns the value currently showing on the key. |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

| | |
|-----------------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:ADJust <time> |
| Example | TRIG:FRAM:ADJ 1.2 ms |
| Notes | Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365 An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event. |
| Notes | The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query. |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

| | |
|-----------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet |
| Example | TRIG:FRAM:OFFS:DISP:RES |
| Initial S/W Revision | Prior to A.02.00 |

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

| | |
|-------------------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal1 EXTernal2 RFBurst OFF :TRIGger[:SEquence]:FRAMe:SYNC? |
| Example | TRIG:FRAM:SYNC EXT2 |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message. |
| Preset | Off GSM/EDGE, MSR,LTE,LTETDD: RFBurst |
| State Saved | Saved in instrument state |
| Readback | The current setting is read back to this key and it is also Readback to the previous Periodic Timer trigger key. |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

| | |
|-----------------------------|---|
| Key Path | Trigger, Periodic Timer, Sync Source |
| Example | TRIG:FRAM:SYNC OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|-----------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement |

| | |
|------------------------------|--|
| | TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative |

| | |
|-------------------------------------|--|
| | :TRIGger[:SEquence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| Key Path | Trigger |
|-------------------------------|--|
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEQuence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| Key Path | Trigger, RF Burst |
|-----------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the |

| | |
|-------------------------------------|--|
| | RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|--------------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

| Key Path | Trigger, Periodic Timer |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff <time> :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff? :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe? |
| Preset | On, 1.000 ms |
| State Saved | Saved in instrument state |
| Min | 0 ms |
| Max | +500 ms |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

| Key Path | Trigger |
|----------------------|--|
| Readback line | Displays a summary of the Auto Trig and Holdoff settings, in square brackets First line: Auto Off or Auto On Second Line: "Hldf" followed by: <ul style="list-style-type: none"> • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal |
| Initial S/W Revision | A.02.00 |

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|---|
| Remote Command | :TRIGger[:SEquence]:ATRigger <time> :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe? |
| Example | TRIG:ATR:STAT ON TRIG:ATR 100 ms |
| Notes | The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 1 ms |
| Max | 100 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATe? |
| Example | TRIG:HOLD:STAT ON TRIG:HOLD 100 ms |
| Dependencies | Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 0 s |
| Max | 0.5 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Gate Preset (Remote Command Only)

Presets the time-gated spectrum analysis capability.

This command sets gate parameter values to the ESA preset values, as follows:

Gate trigger type = edge

Gate polarity = positive

Gate delay = 1 us

Gate length = 1 us

| | |
|-----------------------|---|
| Remote Command | <code>[[:SENSe]:SWEep:TIME:GATE:PRESet</code> ESA Compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Level (Remote Command Only)

Sets the gate input transition point level for the external TRIGGER inputs on the front and rear panel. This is a legacy command for PSA compatibility. It is simply an alias to the equivalent trigger level command.

| | |
|-----------------------|---|
| Remote Command | <code>[[:SENSe]:SWEep:EGATe:EXTernal[1] 2:LEVel <voltage></code> <code>[[:SENSe]:SWEep:EGATe:EXTernal[1] 2:LEVel?</code> |
| Notes | This command is simply an alias to <code>:TRIGger[:SEQuence]:EXTernal[1]2:LEVel</code> For details refer |
| Initial S/W Revision | Prior to A.02.00 |

Gate Polarity (Remote Command Only)

Sets the polarity for the gate signal. This setup is now done using the gate trigger's slope setting.

When Positive (Pos) is selected, a positive-going edge (Edge) or a high voltage (Level) will satisfy the gate condition, after the delay set with the Gate Delay key. When Negative (Neg) is selected, a negative-going edge (Edge) or a low voltage (Level) will satisfy the gate condition after the delay.

| | |
|-------------------------------------|---|
| Remote Command | <code>[[:SENSe]:SWEep:EGATe:POLarity NEGative POSitive</code> <code>[[:SENSe]:SWEep:EGATe:POLarity?</code> |
| Example | <code>SWE:EGAT:POL NEG</code> <code>SWE:EGAT:POL?</code> |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | <code>[[:SENSe]:SWEep:TIME:GATE:POLarity</code> ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|---|
| Remote Command | [:SENSe] :SWEep:TIME:GATE:LEVel HIGH LOW [:SENSe] :SWEep:TIME:GATE:LEVel? ESA compatibility |
| Preset | HIGH |
| Initial S/W Revision | Prior to A.02.00 |

Points

Sets the number of points per sweep. The resolution of setting the time depends on the number of points selected. The current value of points is displayed parenthetically, next to the time in the lower-right corner of the display.

| | |
|--------------------------|---|
| Key Path | Sweep/Control |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :OBWidth:SWEep:POINts <integer> [:SENSe] :OBWidth:SWEep:POINts? |
| Example | OBW:SWE:POIN 1500 OBW:SWE:POIN? |
| Notes | This function is not available when signal identification is set to On (external mixing). Affected by: log sweep Grayed out in measurements that don't support swept Blanked in modes that do not support swept. Whenever the number of sweep points change: - All trace data is erased - Any traces with Update Off also go to Display Off (like going from View to Blank in the older analyzers) - Sweep time is re-quantized - Any limit lines that are on are updated - If averaging/hold is on, averaging/hold starts over |
| Couplings | Whenever the number of sweep points change, the sweep time is re-quantized. |
| Preset | LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 2001 Other: 1001 |
| State Saved | Saved in instrument state. |
| Min | 101 |
| Max | 20001 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

System

See "System" on page 278

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Trace Type

Allows you to select the type of trace you want to you use for the current measurement.

The first page of this menu contains a 1-of-N selection of the trace type (Clear Write, Average, Max Hold, Min Hold) for the selected trace.

| Key Path | Trace/Detector |
|--------------------------|---|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :TRACe:OBWidth:TYPE WRITe AVERAge MAXHold MINHold :TRACe:OBWidth:TYPE? |
| Example | TRAC:OBW:TYPE MINH TRAC:OBW:TYPE? |
| Notes | WRITe = Clear Write AVERAge = Average MAXHold = Maximum Hold MINHold = Minimum Hold |
| Couplings | When Detector setting is "Auto" ([:SENSe]:OBWidth:DETEctor:AUTO?), Detector ([:SENSe]:OBWidth:DETEctor[:FUNctIon]?) switches aligning with the switch of this parameter: "NORMal" with WRITe (Clear Write), "AVERAge" with AVERAge, "POSitive (peak)" with MAXHold, and "NEGative (peak)" with MINHold. |
| Preset | AVERAge BLUETOOTH: MAX HOLD. |
| State Saved | Saved in instrument state. |
| Range | WRITe AVERAge MAXHold MINHold |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Detector

Accesses a menu of functions that enables you to control the detectors for the current measurement. The following choices are available:

- **Auto**– the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- **Normal**–the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- **Average**–the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- **Peak (Positive)**–the detector determines the maximum of the signal within the sweep points.
- **Sample**–the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- **Negative Peak**–the detector determines the minimum of the signal within the sweep points.

| Key Path | Detector |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Auto

When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

| Key Path | Trace/Detector |
|---------------------------------|---|
| Remote Command | <code>[[:SENSe]:OBWidth:DETECTOR:AUTO ON OFF 1 0</code> <code>[[:SENSe]:OBWidth:DETECTOR:AUTO?</code> |
| Example | OBW:DET:AUTO ON OBW:DET:AUTO? |
| Couplings | When Detector setting is “Auto” (<code>[[:SENSe]:OBWidth:DETECTOR:AUTO?</code>), Detector (<code>[[:SENSe]:OBWidth:DETECTOR[:FUNCTION]?</code>) switches aligning with the switch of this parameter: “NORMal” with Clear Write, “AVERage” with AVERage, “POSitive (peak)” with MAXHold, and “NEGative (peak)” with MINHold. |
| Preset | ON ISDB-T: OFF |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Detector Selection

Allows you to select a specific detector for the current measurement. When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

| Key Path | Trace/Detector |
|-------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, ISDB-T, CMMB, LTE, LTE4DD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD |

| | |
|---------------------------------|--|
| Remote Command | [:SENSe]:OBWidth:DETEctor[:FUNction] NORMal AVERage POSitive SAMPlE NEGative [:SENSe]:OBWidth:DETEctor[:FUNction]? |
| Example | OBW:DET NORM OBW:DET? |
| Notes | <p>When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings.</p> <p>The detector choices are:</p> <p>The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.</p> <p>The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS).</p> <p>The Peak detector determines the maximum of the signal within the sweep points.</p> <p>The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.</p> <p>The Negative Peak detector determines the minimum of the signal within the sweep points.</p> |
| Couplings | When Detector setting is "Auto" ([:SENSe]:OBWidth:DETEctor:AUTO?), Detector ([:SENSe]:OBWidth:DETEctor[:FUNction]?) switches aligning with the switch of this parameter: "NORMal" with Clear Write, "AVERage" with AVERage, "POSitive (peak)" with MAXHold, and "NEGative (peak)" with MINHold. |
| Preset | AVERage ISDB-T: Peak BLUETOOTH: Peak |
| State Saved | Saved in instrument state. |
| Range | Normal Average Peak Sample Negative Peak |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See "[Trig Delay](#) " on page 350

Zero Span Delay Comp

See "[Zero Span Delay Comp On/Off](#)" on page 1255

RF Burst

See "[RF Burst](#) " on page 1267

Absolute Trigger

See "[Absolute Trigger Level](#)" on page 1268

Relative Trigger

See "[Relative Trigger Level](#)" on page 1257

Trig Slope

See "[Trigger Slope](#) " on page 1269

Trig Delay

See "[Trig Delay](#) " on page 354

Periodic Timer

See "[Periodic Timer \(Frame Trigger\)](#) " on page 1259

Period

See "[Period](#) " on page 1260

Offset

See "[Offset](#) " on page 1261

Reset Offset Display

See "[Reset Offset Display](#) " on page 1263

Sync Source

See "[Sync Source](#) " on page 1263

Off

See "[Off](#) " on page 1264

External 1

See "[External 1](#) " on page 1264

Trigger Level

See ["Trigger Level "](#) on page 1264

Trig Slope

See ["Trig Slope "](#) on page 1265

External 2

See ["External 2 "](#) on page 1265

Trigger Level

See ["Trigger Level "](#) on page 1266

Trig Slope

See ["Trig Slope "](#) on page 1267

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay"](#) on page 365

Auto/Holdoff

See ["Auto/Holdoff "](#) on page 1270

Auto Trig

See ["Auto Trig "](#) on page 1270

Trig Holdoff

See ["Trig Holdoff "](#) on page 1271

Holdoff Type

See ["Holdoff Type"](#) on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| Key Path | User Preset |
|-----------------------|---|
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses a menu of functions that enable you to set the view and display parameters for the current measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

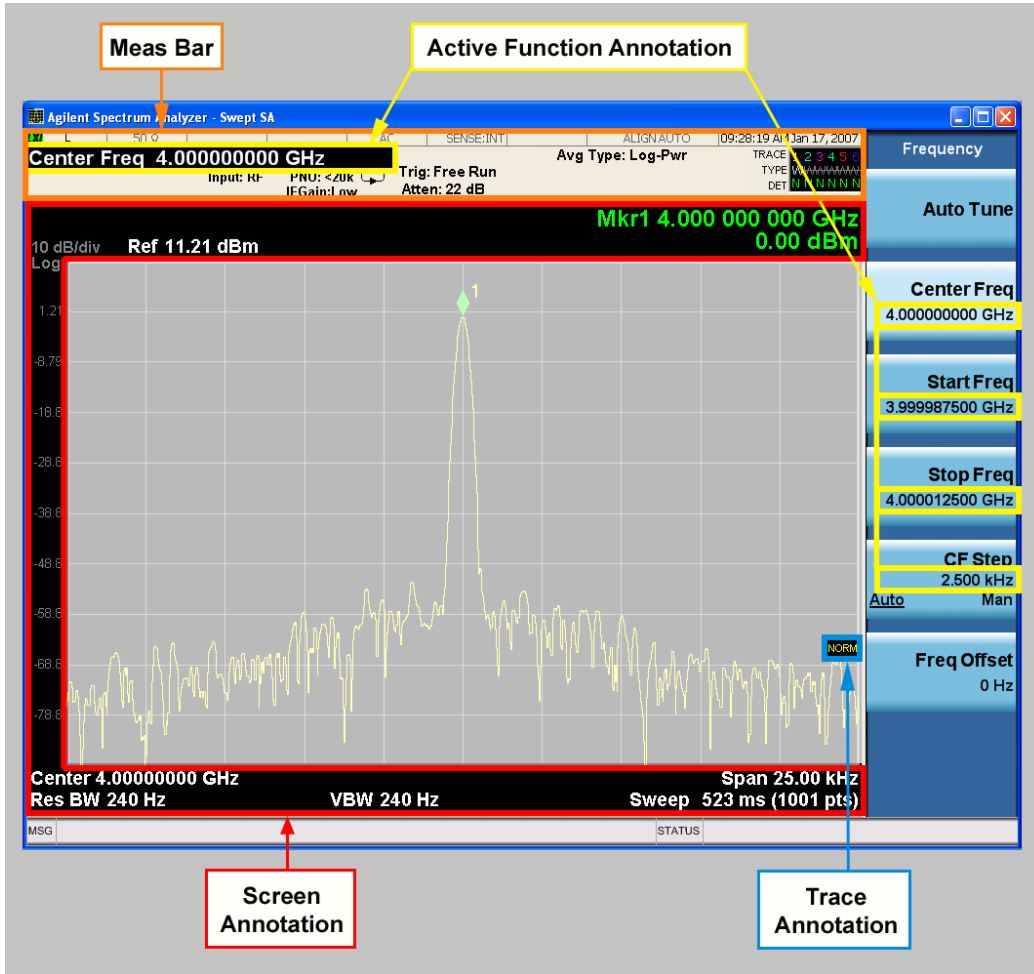
Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.

9 Occupied Bandwidth Measurement
View/Display



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

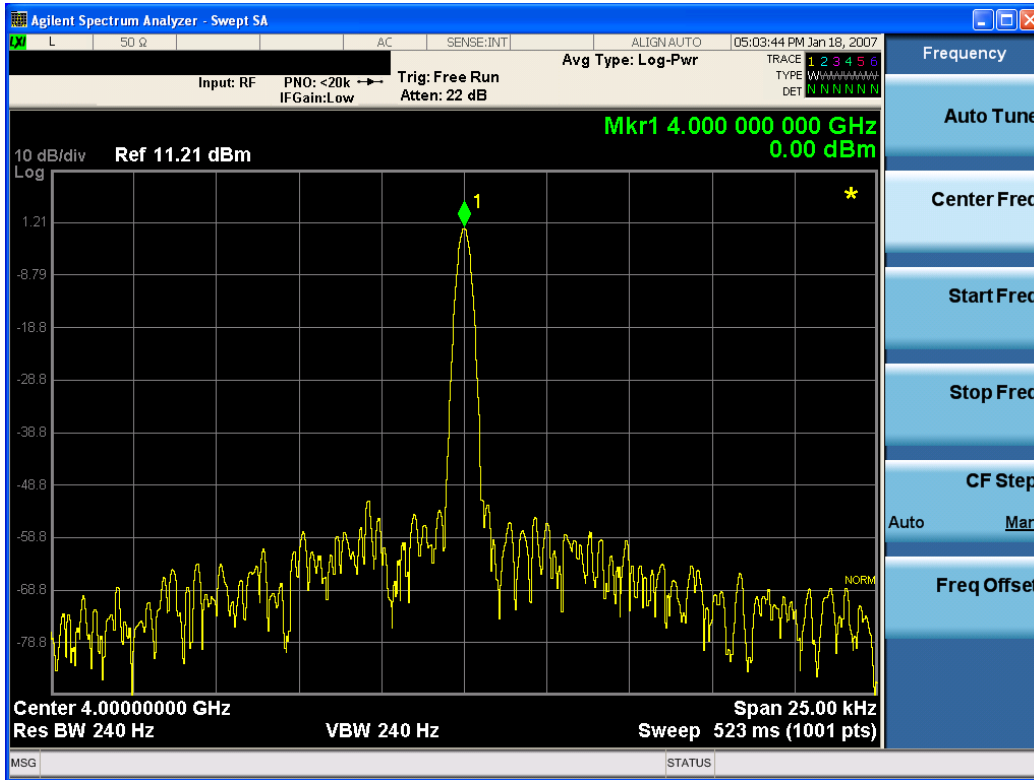
| | |
|-----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

9 Occupied Bandwidth Measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|-----------------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|-----------------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

10 Spectrum Emission Mask Measurement

The spectrum emission mask measures spurious signal levels in up to six pairs of offset frequencies and relates them to the carrier power. For measurement results and views, see ["View/Display" on page 1285](#).

This topic contains the following sections:

["Measurement Commands for Spectrum Emission Mask" on page 958](#)

["Remote Command Results for Spectrum Emission Mask Measurement" on page 959](#)

["Number of Offsets" on page 973](#)

Measurement Commands for Spectrum Emission Mask

Offsets that are turned off (inactive) return -999.0 when their results are queried via SCPI.

```
:CONFigure:SEMask  
:CONFigure:SEMask:NDEFault  
:INITiate:SEMask  
:FETCh:SEMask[n]?  
:MEASure:SEMask[n]?  
:READ:SEMask[n]?
```

For more measurement related commands, see the SENSE subsystem, and the section Remote Measurement Functions@29978.

Remote Command Results for Spectrum Emission Mask Measurement

The following table describes the results returned by the FETCh, MEASure, and READ queries listed above, according to the index value n:

| non_ parameter_ table_ 12.09373 | 3.628118 | 67.42253 |
|---|----------|--|
| Modes | n | Return Value |
| All except MSR, WLAN, LTEAFDD, LTEATDD | 1 | <p>Meas Type: Total Power Reference</p> <p>Returns 82 comma-separated scalar results, in the following order:</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Absolute power at the center frequency (reference) area (dBm) 3. Reserved for the future use, returns -999.0 4. Reserved for the future use, returns -999.0 5. Peak frequency in the center frequency (reference) area (Hz) 6. Reserved for the future use, returns -999.0 7. Reserved for the future use, returns -999.0 8. Reserved for the future use, returns -999.0 9. Reserved for the future use, returns -999.0 10. Reserved for the future use, returns -999.0 11. Relative integrated power on the negative offset A (dBc) 12. Absolute integrated power on the negative offset A (dBm) 13. Relative peak power on the negative offset A (dBc) 14. Absolute peak power on the negative offset A (dBm) 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz) 16. Relative integrated power on the positive offset A (dBc) 17. Absolute integrated power on the positive offset A (dBm) 18. Relative peak power on the positive offset A (dBc) 19. Absolute peak power on the positive offset A (dBm) 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz) 21. Relative integrated power on the negative offset B (dBc) --- 69. Absolute peak power on the positive offset F (dBm) 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz) 71. Minimum margin from limit line on the negative offset A (dB) 72. Minimum margin from limit line on the positive offset A (dB) |

-
- 73. Minimum margin from limit line on the negative offset B (dB)
 - 74. Minimum margin from limit line on the positive offset B (dB)
 - 75. Minimum margin from limit line on the negative offset C (dB)
 - 76. Minimum margin from limit line on the positive offset C (dB)
 - 77. Minimum margin from limit line on the negative offset D (dB)
 - 78. Minimum margin from limit line on the positive offset D (dB)
 - 79. Minimum margin from limit line on the negative offset E (dB)
 - 80. Minimum margin from limit line on the positive offset E (dB)
 - 81. Minimum margin from limit line on the negative offset F (dB)
 - 82. Minimum margin from limit line on the positive offset F (dB)
-

All except MSR, 1
WLAN,
LTEAFDD,
LTEATDD

Meas Type: Power Spectral Density Reference

Returns 82 comma-separated scalar results, in the following order:

1. Reserved for the future use, returns -999.0
 2. Absolute power at the center frequency (reference) area (dBm/Hz)
 3. Reserved for the future use, returns -999.0
 4. Reserved for the future use, returns -999.0
 5. Peak frequency in the center frequency (reference) area (Hz)
 6. Reserved for the future use, returns -999.0
 7. Reserved for the future use, returns -999.0
 8. Reserved for the future use, returns -999.0
 9. Reserved for the future use, returns -999.0
 10. Reserved for the future use, returns -999.0
 11. Relative integrated power on the negative offset A (dB)
 12. Absolute integrated power on the negative offset A (dBm/Hz)
 13. Relative peak power on the negative offset A (dB)
 14. Absolute peak power on the negative offset A (dBm/Hz)
 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
 16. Relative integrated power on the positive offset A (dB)
 17. Absolute integrated power on the positive offset A (dBm/Hz)
 18. Relative peak power on the positive offset A (dB)
 19. Absolute peak power on the positive offset A (dBm/Hz)
 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
 21. Relative integrated power on the negative offset B (dB)
 -
 69. Absolute peak power on the positive offset F (dBm/Hz)
 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)
 71. Minimum margin from limit line on the negative offset A (dB)
 72. Minimum margin from limit line on the positive offset A (dB)
-

-
- 73. Minimum margin from limit line on the negative offset B (dB)
 - 74. Minimum margin from limit line on the positive offset B (dB)
 - 75. Minimum margin from limit line on the negative offset C (dB)
 - 76. Minimum margin from limit line on the positive offset C (dB)
 - 77. Minimum margin from limit line on the negative offset D (dB)
 - 78. Minimum margin from limit line on the positive offset D (dB)
 - 79. Minimum margin from limit line on the negative offset E (dB)
 - 80. Minimum margin from limit line on the positive offset E (dB)
 - 81. Minimum margin from limit line on the negative offset F (dB)
 - 82. Minimum margin from limit line on the positive offset F (dB)
-

All except MSR, 1
 WLAN,
 LTEAFDD,
 LTEATDD

Meas Type: Spectrum Peak Reference

Returns 82 comma-separated scalar results, in the following order:

1. Reserved for the future use, returns -999.0
 2. Peak power at the center frequency (reference) area (dBm)
 3. Reserved for the future use, returns -999.0
 4. Reserved for the future use, returns -999.0
 5. Peak frequency in the center frequency (reference) area (Hz)
 6. Reserved for the future use, returns -999.0
 7. Reserved for the future use, returns -999.0
 8. Reserved for the future use, returns -999.0
 9. Reserved for the future use, returns -999.0
 10. Reserved for the future use, returns -999.0
 11. Reserved for the future use, returns -999.0
 12. Reserved for the future use, returns -999.0
 13. Relative peak power on the negative offset A (dB)
 14. Absolute peak power on the negative offset A (dBm)
 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
 16. Reserved for the future use, returns -999.0
 17. Reserved for the future use, returns -999.0
 18. Relative peak power on the positive offset A (dB)
 19. Absolute peak power on the positive offset A (dBm)
 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
 21. Reserved for the future use, returns -999.0
 -
 69. Absolute peak power on the positive offset F (dBm)
 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)
 71. Minimum margin from limit line on the negative offset A (dB)
 72. Minimum margin from limit line on the positive offset A (dB)
-

-
- 73. Minimum margin from limit line on the negative offset B (dB)
 - 74. Minimum margin from limit line on the positive offset B (dB)
 - 75. Minimum margin from limit line on the negative offset C (dB)
 - 76. Minimum margin from limit line on the positive offset C (dB)
 - 77. Minimum margin from limit line on the negative offset D (dB)
 - 78. Minimum margin from limit line on the positive offset D (dB)
 - 79. Minimum margin from limit line on the negative offset E (dB)
 - 80. Minimum margin from limit line on the positive offset E (dB)
 - 81. Minimum margin from limit line on the negative offset F (dB)
 - 82. Minimum margin from limit line on the positive offset F (dB)
-
-
-

WLAN, 1
with radio
standard
802.11 ac (80
MHz + 80 MHz)

Meas Type: Total Power Reference

Returns 82 comma-separated scalar results, in the following order:

- 1. Reserved for the future use, returns -999.0
 - 2. Absolute reference power (dBm)
 - 3. Absolute power of the carrier of which the frequency is indicated by Freq Segment 1 (dBm)
 - 4. Absolute power of the carrier of which the frequency is indicated by Freq Segment 2 (dBm)
 - 5. Peak frequency in the center frequency (reference) area (Hz)
 - 6. Reserved for the future use, returns -999.0
 - 7. Reserved for the future use, returns -999.0
 - 8. Reserved for the future use, returns -999.0
 - 9. Reserved for the future use, returns -999.0
 - 10. Reserved for the future use, returns -999.0
 - 11. Relative integrated power on the negative offset A (dBc)
 - 12. Absolute integrated power on the negative offset A (dBm)
 - 13. Relative peak power on the negative offset A (dBc)
 - 14. Absolute peak power on the negative offset A (dBm)
 - 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
 - 16. Relative integrated power on the positive offset A (dBc)
 - 17. Absolute integrated power on the positive offset A (dBm)
 - 18. Relative peak power on the positive offset A (dBc)
 - 19. Absolute peak power on the positive offset A (dBm)
 - 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
 - 21. Relative integrated power on the negative offset B (dBc)
 -
 - 69. Absolute peak power on the positive offset F (dBm)
-

-
- 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz)
 - 71. Minimum margin from limit line on the negative offset A (dB)
 - 72. Minimum margin from limit line on the positive offset A (dB)
 - 73. Minimum margin from limit line on the negative offset B (dB)
 - 74. Minimum margin from limit line on the positive offset B (dB)
 - 75. Minimum margin from limit line on the negative offset C (dB)
 - 76. Minimum margin from limit line on the positive offset C (dB)
 - 77. Minimum margin from limit line on the negative offset D (dB)
 - 78. Minimum margin from limit line on the positive offset D (dB)
 - 79. Minimum margin from limit line on the negative offset E (dB)
 - 80. Minimum margin from limit line on the positive offset E (dB)
 - 81. Minimum margin from limit line on the negative offset F (dB)
 - 82. Minimum margin from limit line on the positive offset F (dB)
-

WLAN,
with radio
standard
802.11 ac (80
MHz + 80 MHz)

1

Meas Type: Power Spectral Density Reference

Returns 82 comma-separated scalar results, in the following order:

- 1. Reserved for the future use, returns -999.0
 - 2. Absolute reference power (dBm/Hz)
 - 3. Absolute power of the carrier of which the frequency is indicated by Freq Segment 1 (dBm/Hz)
 - 4. Absolute power of the carrier of which the frequency is indicated by Freq Segment 2 (dBm/Hz)
 - 5. Peak frequency in the center frequency (reference) area (Hz)
 - 6. Reserved for the future use, returns -999.0
 - 7. Reserved for the future use, returns -999.0
 - 8. Reserved for the future use, returns -999.0
 - 9. Reserved for the future use, returns -999.0
 - 10. Reserved for the future use, returns -999.0
 - 11. Relative integrated power on the negative offset A (dB)
 - 12. Absolute integrated power on the negative offset A (dBm/Hz)
 - 13. Relative peak power on the negative offset A (dB)
 - 14. Absolute peak power on the negative offset A (dBm/Hz)
 - 15. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
 - 16. Relative integrated power on the positive offset A (dB)
 - 17. Absolute integrated power on the positive offset A (dBm/Hz)
 - 18. Relative peak power on the positive offset A (dB)
 - 19. Absolute peak power on the positive offset A (dBm/Hz)
 - 20. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
 - 21. Relative integrated power on the negative offset B (dB)
-

| | | |
|-------------------|---|---|
| | | --- |
| | | 69. Absolute peak power on the positive offset F (dBm/Hz) |
| | | 70. Peak power offset frequency from the center or carrier edge frequency in the positive offset F, depending on Offset Frequency Define settings (Hz) |
| | | 71. Minimum margin from limit line on the negative offset A (dB) |
| | | 72. Minimum margin from limit line on the positive offset A (dB) |
| | | 73. Minimum margin from limit line on the negative offset B (dB) |
| | | 74. Minimum margin from limit line on the positive offset B (dB) |
| | | 75. Minimum margin from limit line on the negative offset C (dB) |
| | | 76. Minimum margin from limit line on the positive offset C (dB) |
| | | 77. Minimum margin from limit line on the negative offset D (dB) |
| | | 78. Minimum margin from limit line on the positive offset D (dB) |
| | | 79. Minimum margin from limit line on the negative offset E (dB) |
| | | 80. Minimum margin from limit line on the positive offset E (dB) |
| | | 81. Minimum margin from limit line on the negative offset F (dB) |
| | | 82. Minimum margin from limit line on the positive offset F (dB) |
| All | 2 | Returns the displayed frequency domain spectrum trace data separated by comma. The number of data points is 2001. |
| All | 3 | Returns the displayed frequency domain absolute limit trace data separated by comma. The number of data points is 2001. |
| All | 4 | Returns the displayed frequency domain relative limit trace data separated by comma. The number of data points is 2001. |
| All (see details) | 5 | <p>Meas Type: Total Power Reference</p> <p>Returns comma-separated scalar values (in dBm) of the absolute integrated power of the segment frequencies. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <ol style="list-style-type: none"> Total power reference (dBm) Reserved for the future use, returns -999.0 Absolute integrated power at negative offset frequency (A) Absolute integrated power at positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> Absolute integrated power at negative offset frequency (L) Absolute integrated power at positive offset frequency (L) <p>In MSR and LTE-Advanced FDD/TDD mode.</p> <p>Returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> Ref carrier power. Left ref carrier power if Power Ref type is "Left & Right Carriers." Ref carrier power of the left sub-block if Power Ref type is "Max Power Carrier in Sub-block." (dBm) Right ref carrier power if Ref channel type is "Left & Right Carriers." Ref carrier power of the right sub-block if Power Ref type is "Max Power Carrier in Sub-block." Otherwise -999.0 is returned. (dBm) Absolute integrated power at negative offset frequency (A) |

4. Absolute integrated power at positive offset frequency (A)

25. Absolute integrated power at negative offset frequency (L)

26. Absolute integrated power at positive offset frequency (L)

In **WLAN** mode.

Returns 26 comma-separated scalar values (in dBm) of the absolute integrated power of the segment frequencies:

1. Ref carrier power (dBm)

2. Reserved for the future use, returns -999.0

3. Absolute integrated power at negative offset frequency (A)

4. Absolute integrated power at positive offset frequency (A)

25. Absolute integrated power at negative offset frequency (L)

26. Absolute integrated power at positive offset frequency (L)

If the result is not available, -999.0 is returned.

The number of values returned is subject to change in future releases.

All (see details) 5

Meas Type: Power Spectral Density Reference

Returns comma-separated scalar values (in dBm/Hz) of the absolute integrated power of the segment frequencies. The length of the result depends on the number of available offset (See "[Number of Offsets](#)" on page 973).

1. Power spectral density reference (dBm/Hz)

2. Reserved for the future use, returns -999.0

3. Absolute integrated power at negative offset frequency (A)

4. Absolute integrated power at positive offset frequency (A)

25. Absolute integrated power at negative offset frequency (L)

26. Absolute integrated power at positive offset frequency (L)

In **MSR and LTE-Advanced FDD/TDD** mode.

Returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

1. Ref carrier power. Left ref carrier power if Power Ref type is "Left & Right Carriers" Ref carrier power of the left sub-block if Power Ref type is "Max Power Carrier in Sub-block." (dBm/Hz)

2. Right ref carrier power if Power Ref type is "Left & Right Carriers." Ref carrier power of the right sub-block if Power Ref type is "Max Power Carrier in Sub-block." Otherwise -999.0 is returned. (dBm/Hz)

3. Absolute integrated power at negative offset frequency (A)

4. Absolute integrated power at positive offset frequency (A)

25. Absolute integrated power at negative offset frequency (L)

26. Absolute integrated power at positive offset frequency (L)

In **WLAN** mode.

| | |
|-----------------------------------|---|
| | <p>Returns 26 comma-separated scalar values (in dBm/Hz) of the absolute integrated power of the segment frequencies:</p> <ol style="list-style-type: none"> 1. Ref carrier power (dBm/Hz) 2. Reserved for the future use, returns -999.0 3. Absolute integrated power at negative offset frequency (A) 4. Absolute integrated power at positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. Absolute integrated power at negative offset frequency (L) 26. Absolute integrated power at positive offset frequency (L) <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| <p>All (see details) 5</p> | <p>Meas Type: Spectrum Peak Reference</p> <p>Returns comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <ol style="list-style-type: none"> 1. Spectrum Peak Power reference (dBm) 2. Reserved for the future use, returns -999.0 3. Absolute peak power at negative offset frequency (A) 4. Absolute peak power at positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. Absolute peak power at negative offset frequency (L) 26. Absolute peak power at positive offset frequency (L) <p>In MSR and LTE-Advanced FDD/TDD mode.</p> <p>Returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Spectrum Peak Power reference of ref carrier. Spectrum Peak Power reference of left ref carrier if Power Ref type is "Left & Right Carriers." Spectrum Peak Power reference of the left sub-block if Power Ref type is "Max Power Carrier in Sub-block." (dBm) 2. Spectrum Peak Power reference of right ref carrier power if Power Ref type is "Left & Right carriers." Spectrum Peak Power reference of the right sub-block if Power Ref type is "Max Power Carrier in Sub-block." Otherwise -999.0 is returned. (dBm) 3. Absolute peak power at negative offset frequency (A) 4. Absolute peak power at positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. Absolute peak power at negative offset frequency (L) 26. Absolute peak power at positive offset frequency (L) <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| <p>All 6</p> | <p>Meas Type: Total Power Reference</p> <p>Returns comma-separated scalar values (in dBc) of the integrated power relative to the carrier at the segment frequencies. The length of the result depends on the number of available offset</p> |

(See ["Number of Offsets" on page 973](#)).

When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

1. Reserved for the future use, returns -999.0
2. Reserved for the future use, returns -999.0
3. Relative integrated power at negative offset frequency (A)
4. Relative integrated power at positive offset frequency (A)

25. Relative integrated power at negative offset frequency (L)
26. Relative integrated power at positive offset frequency (L)

If the result is not available, -999.0 is returned.

The number of values returned is subject to change in future releases.

All

6

Meas Type: Power Spectral Density Reference

Returns comma-separated scalar values (in dBc/Hz) of the integrated power relative to the carrier at the segment frequencies. The length of the result depends on the number of available offset (See ["Number of Offsets" on page 973](#)).

When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

Returns -999.0 for the offsets if in WLAN:

1. Reserved for the future use, returns -999.0
2. Reserved for the future use, returns -999.0
3. Relative integrated power at negative offset frequency (A)
4. Relative integrated power at positive offset frequency (A)

25. Relative integrated power at negative offset frequency (L)
26. Relative integrated power at positive offset frequency (L)

If the result is not available, -999.0 is returned.

The number of values returned is subject to change in future releases.

All

6

Meas Type: Spectrum Peak Reference

Returns comma-separated scalar values (in dB) of the integrated power relative to the carrier at the segment frequencies. The length of the result depends on the number of available offset (See ["Number of Offsets" on page 973](#)).

When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

1. Reserved for the future use, returns -999.0
 2. Reserved for the future use, returns -999.0
 3. Relative peak power at negative offset frequency (A)
 4. Relative peak power at positive offset frequency (A)
-

| | | |
|-----|---|---|
| | | <p>---</p> <p>25. Relative peak power at negative offset frequency (L)</p> <p>26. Relative peak power at positive offset frequency (L)</p> <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 7 | <p>Returns comma-separated pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Reserved for the future use, returns -999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) <p>---</p> <p>25. At negative offset frequency (L)</p> <p>26. At positive offset frequency (L)</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 8 | <p>Offset Pass/Fail.</p> <p>Returns comma-separated pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <p>Note: These results (n=8) are the same as n=7 result.</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Reserved for the future use, returns -999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) <p>---</p> <p>25. At negative offset frequency (L)</p> <p>26. At positive offset frequency (L)</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 9 | <p>Offset Peak Power Freq.</p> <p>Returns comma-separated scalar values of frequency (in Hz) that have peak power from center or carrier edge frequency in each offset, depending on Offset Frequency Define settings. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> |

| | | |
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| | | <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Reserved for the future use, returns -999.0 3. Negative offset frequency (A) 4. Positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. Negative offset frequency (L) 26. Positive offset frequency (L) <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 10 | <p>Offset Abs Peak Power.</p> <p>Returns comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Reserved for the future use, returns -999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. At negative offset frequency (L) 26. At positive offset frequency (L) <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 11 | <p>Offset Rel Peak Power.</p> <p>Returns comma-separated scalar values in dBc (dB if MeasType = PSD) of the peak power relative to the carrier at the segment frequencies. The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Reserved for the future use, returns -999.0 2. Reserved for the future use, returns -999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) <p>---</p> <ol style="list-style-type: none"> 25. At negative offset frequency (L) 26. At positive offset frequency (L) |

| | | |
|-----|----|---|
| | | <p>If the result is not available, -999.0 is returned.</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 12 | <p>Returns the power result (the peak power of the signal in the ref channel) when Meas Type is Spectrum Peak reference. Otherwise, the value returned will be -999.0.</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> |
| All | 14 | <p>Meas Type: Total Power Reference</p> <p>Returns comma-separated scalar results, in the following order:</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.</p> <ol style="list-style-type: none"> 1. Relative integrated power on the negative offset A (dBc) 2. Absolute integrated power on the negative offset A (dBm) 3. Relative peak power on the negative offset A (dBc) 4. Absolute peak power on the negative offset A (dBm) 5. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz) 6. Relative integrated power on the positive offset A (dBc) 7. Absolute integrated power on the positive offset A (dBm) 8. Relative peak power on the positive offset A (dBc) 9. Absolute peak power on the positive offset A (dBm) 10. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz) 11. Relative integrated power on the negative offset B (dBc) <p>---</p> <ol style="list-style-type: none"> 119. Absolute peak power on the positive offset L (dBm) 120. Peak power offset frequency from the center or carrier edge frequency in the positive offset L, depending on Offset Frequency Define settings (Hz) <p>If the result is not available, NaN (9.91E+37) is returned.</p> <p>The length of the result depends on the number of available offset (See "Number of Offsets" on page 973).</p> <p>The number of values returned is subject to change in future releases.</p> |
| All | 14 | <p>Meas Type: Power Spectral Density Reference</p> <p>Returns comma-separated scalar results, in the following order:</p> <p>When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-</p> |

Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

1. Relative integrated power on the negative offset A (dB)
2. Absolute integrated power on the negative offset A (dBm/Hz)
3. Relative peak power on the negative offset A (dB)
4. Absolute peak power on the negative offset A (dBm/Hz)
5. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
6. Relative integrated power on the positive offset A (dB)
7. Absolute integrated power on the positive offset A (dBm/Hz)
8. Relative peak power on the positive offset A (dB)
9. Absolute peak power on the positive offset A (dBm/Hz)
10. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
11. Relative integrated power on the negative offset B (dB)
-
119. Absolute peak power on the positive offset L (dBm/Hz)
120. Peak power offset frequency from the center or carrier edge frequency in the positive offset L, depending on Offset Frequency Define settings (Hz)

If the result is not available, NaN (9.91E+37) is returned.

The length of the result depends on the number of available offset (See "[Number of Offsets](#)" on [page 973](#)).

The number of values returned is subject to change in future releases.

All

14

Meas Type: Spectrum Peak Reference

Returns comma-separated scalar results, in the following order:

When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.

1. Reserved for the future use, returns NaN (9.91E+37)
 2. Reserved for the future use, returns NaN (9.91E+37)
 3. Relative peak power on the negative offset A (dB)
 4. Absolute peak power on the negative offset A (dBm)
 5. Peak power offset frequency from the center or carrier edge frequency in the negative offset A, depending on Offset Frequency Define settings (Hz)
 6. Reserved for the future use, returns NaN (9.91E+37)
 7. Reserved for the future use, returns NaN (9.91E+37)
 8. Relative peak power on the positive offset A (dB)
 9. Absolute peak power on the positive offset A (dBm)
 10. Peak power offset frequency from the center or carrier edge frequency in the positive offset A, depending on Offset Frequency Define settings (Hz)
 11. Relative integrated power on the negative offset B (dB)
-

| | | |
|-----------|----|--|
| | | --- |
| | | 119. Absolute peak power on the positive offset L (dBm) |
| | | 120. Peak power offset frequency from the center or carrier edge frequency in the positive offset L, depending on Offset Frequency Define settings (Hz) |
| | | If the result is not available, NaN (9.91E+37) is returned. |
| | | The length of the result depends on the number of available offset (See "Number of Offsets" on page 973). |
| | | The number of values returned is subject to change in future releases. |
| All | 15 | |
| | | Meas Type: Total Power Reference |
| | | Returns comma-separated scalar results, in the following order: |
| | | When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order. |
| | | 1. Minimum margin from limit line on the negative offset A (dB) |
| | | 2. Minimum margin from limit line on the positive offset A (dB) |
| | | 3. Minimum margin from limit line on the negative offset B (dB) |
| | | 4. Minimum margin from limit line on the positive offset B (dB) |
| | | --- |
| | | 23. Minimum margin from limit line on the negative offset L (dB) |
| | | 24. Minimum margin from limit line on the positive offset L (dB) |
| | | If the result is not available, NaN (9.91E+37) is returned. |
| | | The length of the result depends on the number of available offset (See "Number of Offsets" on page 973). |
| | | The number of values returned is subject to change in future releases. |
| WLAN only | 16 | |
| | | Returns two carriers comma-separated scalar results when the radio standard is 802.11ac 80+80 MHz. And returns NaN otherwise. |
| | | 1. Absolute power of carrier segment 1 (dBm) |
| | | 2. Absolute power of carrier segment 2 (dBm) |

Number of Offsets

The number of available offsets varies depending on the mode and option as below.

| | |
|---------------------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Mode | The number of available offsets |
| WLAN | 12 (Offset A to L) |
| Other modes with option N9060A-7FP | 12 (Offset A to L) |
| Other modes without option N9060A-7FP | 6 (Offset A to F) |

| | |
|---------------------------------|------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00, A.14.00 |
| Help Map ID | 9053 |

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values and Internal Preamp selections that are measurement global.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9056 |

Ref Value

Sets the value for the absolute power reference. However, since Auto Scaling defaults to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:SEM:VIEW:WIND:TRAC:Y:RLEV 100 DISP:SEM:VIEW:WIND:TRAC:Y:RLEV? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changed to Off. |
| Preset | 10.0 dBm |
| State Saved | Saved in instrument state. |
| Min | -250 dBm |
| Max | 250 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9000 |

Range

The Range menu allows setting amplitude controls of the instrument.

| | |
|----------------------|----------------------|
| Key Path | AMPTD Y Scale |
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|-----------------------|---|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | [:SENSe] :POWer [:RF] :RANGe <real> [:SENSe] :POWer [:RF] :RANGe? |
| Example | :POW:RANG 10.0 :POW:RANG? |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | [:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|---------------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation OFF ON ELECTrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation ?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|-----------------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio ?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| Key Path | AMPTD Y Scale, Range |
|-----------------------|--|
| Remote Command | [:SENSe]:POWer[:RF]:RANGe:MIXer:OFFSet <real> [:SENSe]:POWer[:RF]:RANGe:MIXer:OFFSet? |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div

Sets the units-per-division of the vertical scale in the logarithmic display. When Auto Scaling is On, the scale per division value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

| parameter_ | 54.42177 |
|-----------------------|---|
| table_24.18745 | |
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:PDIVision <rel_ampl> :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:PDIVision? |
| Example | DISP:SEM:VIEW:WIND:TRAC:Y:PDIV 15dB DISP:SEM:VIEW:WIND:TRAC:Y:PDIV? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | When the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|--------------------------|------------------|
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9001 |

Ref Position

Positions the reference level at the top, center or bottom of the Y scale display. Changing the reference position does not affect the reference level value.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | AMPTD Y Scale |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTEFDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTer BOTTom :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | DISP:SEM:VIEW:WIND:TRAC:Y:RPOS BOTT DISP:SEM:VIEW:WIND:TRAC:Y:RPOS? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Preset | TOP |
| State Saved | Saved in instrument state |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9002 |

Auto Scaling

Toggles the Auto Scaling function between On and Off.

When Auto Scaling is On and the Restart front-panel key is pressed, the analyzer automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.

| | |
|--------------------------|----------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | AMPTD Y Scale |

| | |
|--------------------------|--|
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 ON OFF :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | DISP:SEM:VIEW:WIND:TRAC:Y:COUP OFF DISP:SEM:VIEW:WIND:TRAC:Y:COUP? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | ON |
| State Saved | Saved in instrument state |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9003 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 980](#)

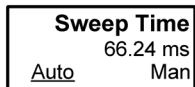
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPLe ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPLe ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

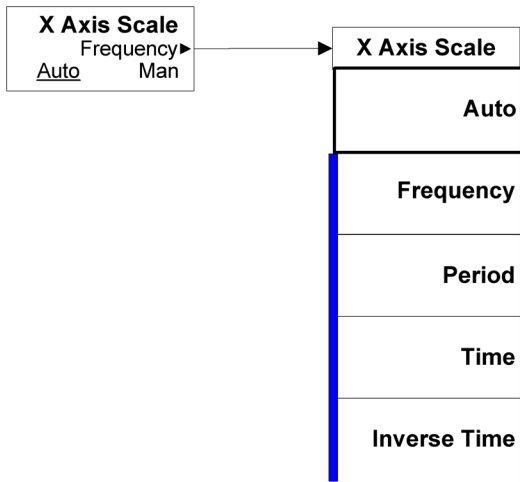
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



vsd08

BW

Accesses a menu of functions that enable you to select the type of filter for the measurement.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |
| Help Map ID | 9061 |

Filter Type

Selects the type of bandwidth filter that is used in Carrier and Offsets.

When Gaussian or Flattop is selected, selected filter is applied to carriers and all offsets.

When Auto Sense is selected, filter type is automatically selected for each carriers and offsets, so that measurement speed and accuracy is optimized.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | BW |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:BANDwidth:SHAPE ASENse GAUSSian FLATtop [:SENSe] :SEMAsk:BANDwidth:SHAPE? |
| Example | SEM:BAND:SHAP GAUS SEM:BAND:SHAP? |
| Couplings | See the description above |
| Preset | ASENse |
| State Saved | Saved in instrument state |
| Range | Auto Sense (each offset and carrier) Gaussian (all offsets and carriers) Flattop (all offsets and carriers) |
| Initial S/W Revision | A.03.00 |
| Help Map ID | 9078 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

10 Spectrum Emission Mask Measurement
Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 989](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 991](#)

See ["Center Frequency Presets" on page 987](#)

| Key Path | FREQ Channel |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 987 and "RF Center Freq" on page 989 and Ext Mix Center Freq and "I/Q Center Freq" on page 991. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 987 and "RF Center Freq" on page 989 and "I/Q Center Freq" on page 991. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 987 and "RF Center Freq" on page 989 and "I/Q Center Freq" on page 991. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

10 Spectrum Emission Mask Measurement
 FREQ Channel

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code> |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|---|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENt 60 GHz</code> <code>:FREQ:EMIX:CENt?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|-----------------------|---|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP [:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | <p>FREQ:CENT:STEP:AUTO ON</p> <p>FREQ:CENT:STEP 500 MHz</p> <p>FREQ:CENT UP increases the current center frequency value by 500 MHz</p> <p>FREQ:CENT:STEP?</p> <p>FREQ:CENT:STEP:AUTO?</p> |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | <p>Span, RBW, Center frequency</p> <p>If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning.</p> |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | <p>Auto</p> <p>ADEMODO: 1 MHz</p> <p>ON</p> |
| State Saved | Saved in instrument state |
| Min | – (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Input/Output

See "Input/Output" on page 162

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement. If there are no active markers, **Marker** selects marker 1, sets it to Normal and places it at the center of the display. You can turn on and control up to 12 markers.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9071 |

Select Marker

Displays 12 markers available for selection.

| | |
|--------------------------|------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9038 |

Marker Type

Sets the marker control mode to Normal and Off. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. The marker X axis value entered in the active function area will display the marker value to its full entered precision. If the current control mode for the measurement is Off, there is no active function and the active function is turned off.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMask:MARKer[1] 2 ... 12:MODE POSition OFF :CALCulate:SEMask:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:SEM:MARK:MODE POS CALC:SEM:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. Note that if the current |

| | |
|--------------------------|--|
| | control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. |
| Preset | OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF |
| State Saved | Saved in instrument state |
| Range | Normal Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9046 |

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker that is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMask:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:SEMask:MARKer:COUPle[:STATe]? |
| Example | CALC:SEM:MARK:COUP ON CALC:SEM:MARK:COUP? |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9050 |

All Markers Off

Turns all active markers off in all views.

| | |
|------------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Marker |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMAsk:MARKer:AOff |
| Example | CALC:SEM:MARK:AOff |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9051 |

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is **Normal**.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMAsk:MARKer[1] 2 ... 12:X <freq> :CALCulate:SEMAsk:MARKer[1] 2 ... 12:X? |
| Example | CALC:SEM:MARK3:X 1.0 GHz CALC:SEM:MARK3:X? |
| Notes | If no suffix is sent it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" will be generated. The query returns the marker's absolute X Axis value if the control mode is Normal . The query is returned in the fundamental units for the current marker X Axis scale. If the marker is Off the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. |
| Preset | After a preset, all Markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|--------------------------|------------------|
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 0 |

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal**, except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMask:MARKer[1] 2 ... 12:X:POsition <real> :CALCulate:SEMask:MARKer[1] 2 ... 12:X:POsition? |
| Example | CALC:SEM:MARK10:X:POS 1001 CALC:SEM:MARK10:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal . The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points . If the marker is Off the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. |
| Preset | After a preset, all Markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 0 |

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

| | |
|---|---|
| parameter_table_ 24.18745 | 54.42177 |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMask:MARKer[1] 2 ... 12:Y? |
| Example | CALC:SEM:MARK11:Y 10 dBm CALC:SEM:MARK11:Y? |
| Notes | Since the result value is always calculated from acquisition data, the default value is arbitrary, although the Preset/Default values is defined. |
| Preset | Result dependent on markers setup and signal source |
| State Saved | No |
| Backwards Compatibility SCPI | :CALCulate:SEMask:MARKer[1] 2 ... 12:FUNCTION:RESult? |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 0 |

Marker Function

There are no 'Marker Functions' supported in Spectrum Emission Mask so this front-panel key displays a blank menu when pressed.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9074 |

Marker To

There is no 'Marker To' functionality supported in Spectrum Emission Mask so this front-panel key displays a blank menu when pressed.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9073 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 2431

"Current Measurement Query (Remote Command Only)" on page 2433

"Limit Test Current Results (Remote Command Only)" on page 2433

"Data Query (Remote Command Only)" on page 2433

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 2434

"Calculate Peaks of Trace Data (Remote Command Only)" on page 2439

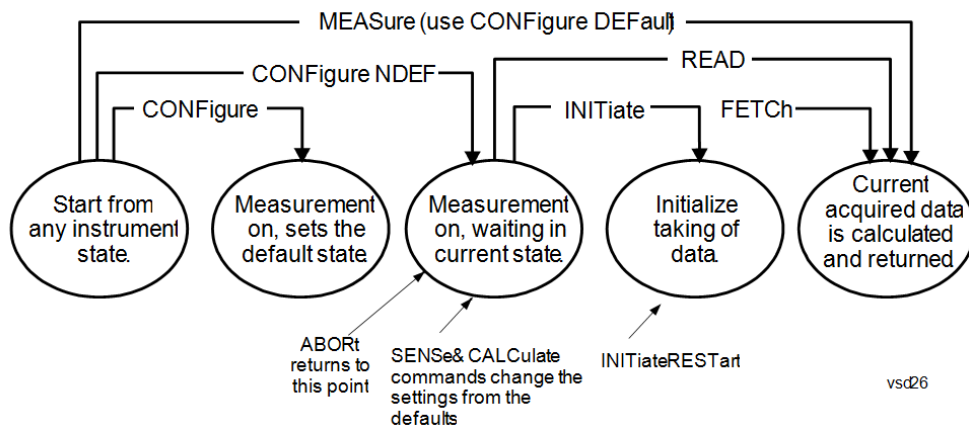
"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 2440

"Format Data: Numeric Data (Remote Command Only)" on page 2454

"Format Data: Byte Order (Remote Command Only)" on page 2455

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSE:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh< meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
- For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
- Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
- If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$MEAN = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$MEAN = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

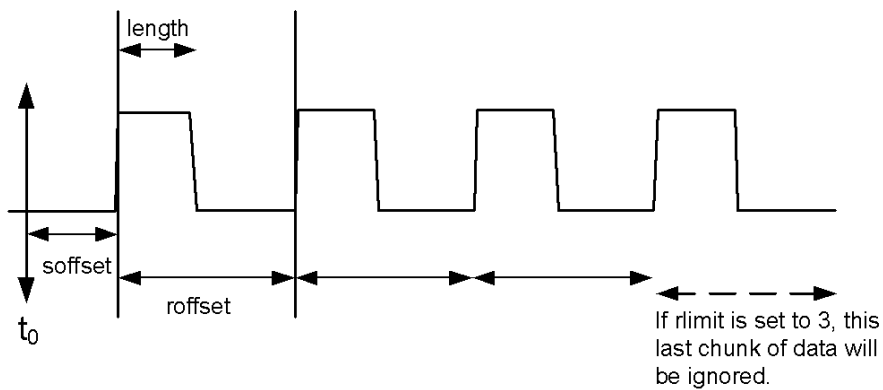
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

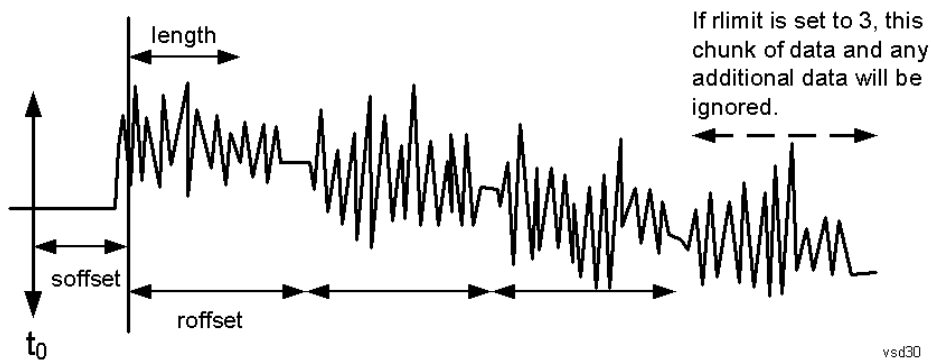
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|--|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
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| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
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| | |
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| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:RESet |
| Example | :CALC:FPOW:POW1:RES |

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| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 – 24 dB (1 dB steps) |

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| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

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| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 – 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

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|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

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| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1 e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

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| Initial S/W Revision | A.14.00 |
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Channel Measurement Function Array

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| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
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| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

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| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

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R :CALCulate:FPOWER:POWer[1,2,...,999]:DEFine?
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E :CALC:FPOW:POW1:DEF?

```

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N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,
e,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

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|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
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| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat[:TRACe][:DATA] ASCii INTEger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTEger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDer NORMal SWAPped :FORMat:BORDer? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Displays the setup menu for the currently selected measurement.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9062 |

Avg/Hold Num

Toggles averaging On or Off in addition to enabling you to set the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep. After the specified number of average counts, the average mode (termination control) setting determines the average action.

In the remote mode, use the Average State command to turn averaging on or off.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:AVERage:COUNT <integer> [:SENSe]:SEMAsk:AVERage:COUNT? [:SENSe]:SEMAsk:AVERage[:STATe] ON OFF 1 0 [:SENSe]:SEMAsk:AVERage[:STATe]? |
| Example | SEM:AVER:COUN 100 SEM:AVER:COUN? SEM:AVER ON SEM:AVER? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | 10 OFF |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Help Map ID 9012

Meas Type

Accesses a menu that enables you to select one of the following measurement reference types:

- Total Pwr Ref – Sets the reference to the total carrier power and the measured data is shown in dBc and dBm.
- PSD Ref – Sets the reference to the mean power spectral density of the carrier and the measured data is shown in dB and dBm/Hz.
- Spectrum Peak Ref – Sets the reference to the spectrum peak power of the carrier and the measured data is shown in dB and dBm.

| | |
|---------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:TYPE PSDRef TPreRef SPRef [:SENSe] :SEMAsk:TYPE? |
| Example | SEM:TYPE PSDR SEM:TYPE? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SELEct to set the mode. |
| Preset | SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD, LTEATDD: TPreRef WIMAX OFDMA, WLAN: SPRef |
| State Saved | Saved in instrument state. |
| Range | Total Pwr Ref PSD Ref Spectrum Peak Ref |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9013 |

Ref Channel

Accesses a menu that enables you to set up the measurement parameters used to calculate the power in the reference channel.

| | |
|--------------------------|-----------------|
| parameter_table_24.18745 | 54.42177 |
|--------------------------|-----------------|

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9063 |

Integ BW

Specifies the integration bandwidth used to calculate the power in the reference channel.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :SEMAsk:BA NDwidth[1] 2 :INTEgration <bandwidth></code> <code>[:SENSe] :SEMAsk:BA NDwidth[1] 2 :INTEgration?</code> |
| Example | SEM:BAND:INT 10 MHz SEM:BAND:INT? |
| Notes | 10% . 100% of Channel Span Parameter Value Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. Note that Bandwidth sub op code 2 is supported only in Non-SA modes. In the SA mode, Bandwidth sub op code 1 is used for both BTS and MS. If the ref channel is outside of the frequency range, the result spectrum will be invalid. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | Cannot be higher than the channel Span. If lower than 1/10 of channel Span, then the channel Span is reduced to be 10 times the Integ BW. |
| Preset | SA: 3.84 MHz WCDMA: 3.84 MHz 3.84 MHz C2K: 1.23 MHz 1.23 MHz WIMAX OFDMA: 10 MHz 10 MHz TD-SCDMA: 1.28 MHz 1.28 MHz 1xEVDO: 1.23MHz DTMB (CTTB): 7.56MHz DVB-T/H: 7.61MHz ISDB-T: 5.6MHz CMMB: 7.512MHz LTE, LTEAFDD: 4.515MHz 4.5MHz LTETDD, LTEATDD: 4.515MHz 4.5MHz Digital Cable TV: 6.9MHz WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM)/802.11n(20 MHz)/ 802.11ac (20 MHz): 18 MHz |

| | |
|--------------------------|--|
| | if Radio Std is 802.11b/g(DSSS/CCK/PBCC): 22 MHz if Radio Std is 802.11n(40MHz)/ 802.11 ac (40 MHz): 38 MHz if Radio Std is 802.11 ac (80 MHz): 78 MHz if Radio Std is 802.11 ac (160 MHz): 158 MHz if Radio Std is 802.11 ac (80 MHz + 80 MHz): 78 MHz if Radio Std is 802.11 ah (1 MHz): 0.9 MHz if Radio Std is 802.11 ah (2 MHz): 1.8 MHz if Radio Std is 802.11 ah (4 MHz): 3.8 MHz if Radio Std is 802.11 ah (8 MHz): 7.8 MHz if Radio Std is 802.11 ah (16 MHz): 15.8 MHz if Radio Std is 802.11j/p (20 MHz): 18 MHz if Radio Std is 802.11j/p (10 MHz): 9 MHz if Radio Std is 802.11p (5 MHz): 4.5 MHz |
| State Saved | Saved in instrument state. |
| Min | LTEAFDD, LTEATDD, LTE, LTETDD: 100kHz Others: 1 kHz |
| Max | Depends on instrument maximum frequency. Same as the Max Span on Swept SA Measurement. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.16.00 |
| Help Map ID | 9014 |

Span

Specifies the span used to calculate the power in the reference channel.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, LTE, LTETDD, CMMB, Digital Cable TV, WLAN, LTEAFDD, LTEATDD |
| Remote Command | <pre>[:SENSe] :SEMAsk:FREQuency[1] 2:SPAN <freq> [:SENSe] :SEMAsk:FREQuency[1] 2:SPAN? [:SENSe] :SEMAsk:FREQuency[1] 2:SPAN:AUTO ON OFF 1 0 [:SENSe] :SEMAsk:FREQuency[1] 2:SPAN:AUTO?</pre> |
| Example | <pre>SEM:FREQ:SPAN 3MHz SEM:FREQ:SPAN?</pre> |

| | |
|-----------|---|
| | <p>:SEM:FREQ:SPAN:AUTO OFF :SEM:FREQ:SPAN:AUTO?</p> |
| Notes | <p>Frequency sub op code, 1 is for BTS, 2 for MS. Default is BTS. Note that Frequency sub op code 2 is supported only in Non-SA modes. In the SA mode, Frequency sub op code 1 is used for both BTS and MS. If the ref channel is outside of the frequency range, the result spectrum will be invalid. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. Span Auto/Man State [:SENSe]:SEMAsk:FREQuency[1]2:SPAN:AUTO) is only available in LTE/LTE-Advanced FDD/TDD mode. The BAF SCPI is LTE/LTE-Advanced FDD/TDD only.</p> |
| Couplings | <p>Range 1 kHz to 50 MHz (although restricted by Integ BW). If you set the channel Span lower than channel Integ BW, they will both track each other. As you increase the channel Span, the Integ BW will also increase if it is less than 1/10 of the channel Span. For WLAN 802.11 ac (80 + 80 MHz), the channel span is coupled with the difference between the center frequencies of the two carriers. When the difference is either less than 80 MHz or greater than 565 MHz, a “setting conflict” error message is displayed. Chan Span = Carrier Spacing + Chan IntegBW; When the state of Span is Auto, the span value is automatically determined by multi-carrier configuration. Otherwise, the span value depends on User's input. When the span value is set manually, the state of span is automatically changes to Man. This key is enabled and can be changed only in single carrier. And the span state is always kept as Auto in Multi-carriers.</p> |
| Preset | <p>SA: 5.0 MHz WCDMA: 5.0 MHz 5.0 MHz C2K: 1.25 MHz 1.25 MHz WIMAX OFDMA: 10 MHz 10 MHz TD-SCDMA: 1.6 MHz 1.6 MHz 1xEVDO: 1.25 MHz DTMB (CTTB): 10 MHz DVB-T/H: 10 MHz ISDB-T: 8 MHz CMMB: 10 MHz LTE, LTEAFDD: 5 MHz LTETDD, LTEATDD: 5 MHz Digital Cable TV: 10 MHz WLAN: if Radio Std is 802.11 a/g(OFDM/DSSS-OFDM)/802.11n(20 MHz)/ 802.11ac (20 MHz): 18 MHz if Radio Std is 802.11 b/g(DSSS/CCK/PBCC): 22 MHz if Radio Std is 802.11n(40MHz)/ 802.11ac (40 MHz): 38 MHz if Radio Std is 802.11ac (80 MHz): 78 MHz if Radio Std is 802.11ac (160 MHz): 158 MHz if Radio Std is 802.11ac (80 MHz + 80 MHz): 240 MHz</p> |

| | |
|--------------------------|--|
| | if Radio Std is 802.11ah (1 MHz): 0.9 MHz if Radio Std is 802.11ah (2 MHz): 1.8 MHz if Radio Std is 802.11ah (4 MHz): 3.8 MHz if Radio Std is 802.11ah (8 MHz): 7.8 MHz if Radio Std is 802.11ah (16 MHz): 15.8 MHz if Radio Std is 802.11j/p (20 MHz): 18 MHz if Radio Std is 802.11j/p (10 MHz): 9 MHz if Radio Std is 802.11p (5 MHz): 4.5 MHz |
| | ON |
| State Saved | Saved in instrument state. |
| Min | LTEAFDD, LTEATDD, LTE, LTETDD:100KHz Others: 1 kHz |
| Max | Depends on instrument maximum frequency. Same as the Max Span on Swept SA Measurement. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.16.00 |
| Help Map ID | 9015 |

Sweep Time

Sets the time used to calculate the power in the reference channel. Time can be set manually or put in auto mode.

| | |
|---------------------------|--|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMask:SWEep[1] 2:TIME <time> [:SENSe] :SEMask:SWEep[1] 2:TIME? [:SENSe] :SEMask:SWEep[1] 2:TIME:AUTO OFF 0 ON 1 [:SENSe] :SEMask:SWEep[1] 2:TIME:AUTO? |
| Example | SEM:SWE:TIME 9ms SEM:SWE:TIME? SEM:SWE:TIME:AUTO OFF SEM:SWE:TIME:AUTO? |
| Notes | Sub op code, 1 is for BTS, 2 for MS. Default is BTS. |

Note that Sweep sub op code 2 is supported only in Non-SA modes.
In the SA mode, Sweep sub op code 1 is used for both BTS and MS.
You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode.

| | |
|--------------------------|--|
| Couplings | When the time is set manually, Auto is set to OFF. Value is coupled with Channel Detector selection, Channel Resolution BW, Channel Video BW if the state is Auto. When set to Auto, the Time is automatically calculated. |
| Preset | Automatically calculated ON |
| State Saved | Saved in instrument state. |
| Min | X-Series HW: Depends on Channel Sweep Type Sweep Type "Swept": 1 ms Sweep Type "FFT": 100ns E6630A_E6640A_M90XA:TBD E7515A: 39.2 usec |
| Max | 4000 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.16.00 |
| Help Map ID | 9016 |

Res BW

Sets the resolution bandwidth used to calculate the power in the reference channel. The Channel Resolution BW can be set manually or put in to auto mode.

| Radio Format | RBW (kHz) | |
|--------------|-----------|-----|
| LTE | 1.4 MHz | 13 |
| | 3 MHz | 27 |
| | 5 MHz | 47 |
| | 10 MHz | 91 |
| | 15 MHz | 150 |
| | 20 MHz | 180 |
| W-CDMA | | 75 |
| GSM | | 30 |

In LTE-Advanced FDD/TDD, the resolution bandwidth is predefined based on the corresponding bandwidth of the single LTE carrier, which is listed above. When ResBW mode is Auto, the narrowest RBW is selected.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:BANDwidth[1] 2[:RESolution] <bandwidth> [:SENSe]:SEMAsk:BANDwidth[1] 2[:RESolution]? [:SENSe]:SEMAsk:BANDwidth[1] 2[:RESolution]:AUTO OFF ON 1 0 [:SENSe]:SEMAsk:BANDwidth[1] 2[:RESolution]:AUTO? |
| Example | SEM:BAND 100 kHz SEM:BAND? SEM:BAND:AUTO ON SEM:BAND:AUTO? |
| Notes | Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. Note that Bandwidth sub op code 2 is supported only in Non-SA modes. In the SA mode, Bandwidth sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When Res BW is set manually, Channel Resolution BW Mode is set to MANual. Value is coupled with Channel Detector selection, Channel Time, Channel Video BW. When set to Auto, the resolution bandwidth is automatically calculated. |
| Preset | SA: 100 kHz WCDMA: 75 kHz C2K: 24 kHz WIMAX OFDMA: 100 kHz TD-SCDMA: 30 kHz 1xEVDO: 30.0 KHz DTMB (CTTB): 3.9 kHz DVB-T/H: 3.9 kHz ISDB-T: 10 kHz CMMB: 3.9 kHz LTE, LTETDD, MSR, LTEAFDD, LTEATDD:Auto (47 kHz) Digital Cable TV: 3.9 kHz WLAN: 100 kHz ON |
| State Saved | Saved in instrument state. |

| | |
|-------------------------------------|--|
| Min | 1 Hz |
| Max | 8 MHz |
| Backwards Compatibility SCPI | <code>[:SENSe] :SEMAsk:BWIDth [1] 2 [:RESolution]</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9017 |

Video BW

Sets the video bandwidth used to calculate the power in the reference channel. The Channel Video BW can be set manually or put in to auto mode.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :SEMAsk:BA NDwidth [1] 2 :VIDeo <bandwidth></code> <code>[:SENSe] :SEMAsk:BA NDwidth [1] 2 :VIDeo?</code> <code>[:SENSe] :SEMAsk:BA NDwidth [1] 2 :VIDeo:AUTO OFF ON 1 0</code> <code>[:SENSe] :SEMAsk:BA NDwidth [1] 2 :VIDeo:AUTO?</code> |
| Example | SEM:BA ND:VID 100 kHz SEM:BA ND:VID? SEM:BA ND:VID:AUTO ON SEM:BA ND:VID:AUTO? |
| Notes | Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. Note that Bandwidth sub op code 2 is supported only in Non-SA modes. In the SA mode, Bandwidth sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When Video BW is set manually, Channel Video BW Mode is set to MANual Value is coupled with Channel Detector selection, Channel Time, Channel Resolution BW. When set to Auto, the video bandwidth is automatically calculated. |
| Preset | SA: 100 kHz WCDMA: 75 kHz C2K: 24 kHz WIMAX OFDMA: 30 kHz TD-SCDMA: 300 kHz |

| | |
|-------------------------------------|--|
| | 1xEVDO: 300.0 kHz DTMB (CTTB): 39 kHz DVB-T/H: 39 kHz ISDB-T: 1 kHz CMMB: 39 kHz LTE, MSR, LTEAFDD, LTEATDD: Auto LTETDD: Auto Digital Cable TV: 39 kHz WLAN: Auto ON |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 50 MHz |
| Backwards Compatibility SCPI | [:SENSe] : SEMask : BWIDth [1] 2 : VIDeo |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9007 |

VBW/RBW

Sets the Video BW/Resolution BW Ratio to calculate the Channel Resolution BW and Channel Video BW. The VBW/RBW Ratio can be set manually or put in to auto mode.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA mode, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <pre>[:SENSe] : SEMask : BANDwidth [1] 2 : VIDeo : RATio <real> [:SENSe] : SEMask : BANDwidth [1] 2 : VIDeo : RATio [:SENSe] : SEMask : BANDwidth [1] 2 : VIDeo : RATio : AUTO OFF ON 1 0 [:SENSe] : SEMask : BANDwidth [1] 2 : VIDeo : RATio : AUTO ?</pre> |
| Example | <pre>SEM:BAND:VID:RAT 0.1 SEM:BAND:VID:RAT? SEM:BAND:VID:RAT:AUTO ON SEM:BAND:VID:RAT:AUTO?</pre> |
| Notes | Bandwidth sub op code, 1 is for BTS, 2 for MS. Default is BTS. |

| | |
|-------------------------------------|---|
| | Note that Bandwidth sub op code 2 is supported only in Non-SA modes. In the SA mode, Bandwidth sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When Video BW/Res BW is set manually, Channel VBW/RBW Ratio Mode is set to MANual When set to Auto, the VBW/RBW Ratio is automatically calculated. |
| Preset | SA, WCDMA, C2K: 1.0 WIMAX OFDMA: 0.3 TD-SCDMA: 10 1xEVDO: 10.0 DTMB (CTTB): 10 DVB-T/H: 10 ISDB-T: 0.1 CMMB: 10 LTE, MSR: Auto LTEAFDD,LTEATDD:Auto LTETDD: Auto Digital Cable TV: 10 WLAN: Auto ON |
| State Saved | Saved in instrument state. |
| Min | 0.00001 |
| Max | 3000000 |
| Backwards Compatibility SCPI | [:SENSE] :SEMAsk:BWIDth[1] 2:VIDeo:RATio |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9009 |

Power Ref (for the modes except MSR and LTE-Advanced FDD/TDD)

Sets the power reference in the carrier that will be used to compute the relative values for the offsets.

| | |
|--------------------------|--------------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9040 |

Total Power

Sets the power in the carrier (ref channel) that is used to compute the relative power values for the offsets. When the state is set to auto, this value is set to the measured carrier reference power. When set to manual, the result takes on the last measured value, or can be manually entered.

For WLAN 802.11ac (80 MHz + 80 MHz), the higher of the power readouts of the two carriers is used for computing the relative power values for the offset.

| | |
|------------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel, Power Ref |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:CARRier[:POWer] <real> [:SENSe]:SEMAsk:CARRier[:POWer]? [:SENSe]:SEMAsk:CARRier:AUTO[:STATe] OFF ON 1 0 [:SENSe]:SEMAsk:CARRier:AUTO[:STATe]? |
| Example | SEM:CARR 100dBm SEM:CARR? SEM:CARR:AUTO OFF SEM:CARR:AUTO? |
| Notes | The min and max values given are for Meas Type = Total Pwr Ref. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode.. This BAF SCPI command is available in all the Meas Type case. This BAF SCPI command is not available in MSR and LTE-Advanced FDD/TDD mode. |
| Dependencies | This "Total Power Ref" parameter is coupled with the "Meas Type" parameter. The softkey is active when Meas Type is set to Total Power Ref. Otherwise, it is grayed out. |
| Preset | Measured carrier reference power |
| State Saved | Saved in instrument state. |
| Min | -200 dBm |
| Max | 200 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9018 |

PSD

Sets the power spectral density in the carrier that is used to compute the relative power spectral density values for the offsets when Meas Type is set to PSD Ref. When the state is set to auto, this will be set to

the measured carrier power spectral density.

For WLAN 802.11ac (80 MHz + 80 MHz), the higher of the power density readouts of the two carriers is used for computing the relative PSD values for the offset.

| | |
|------------------------------|--|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Chan, Power Ref |
| Mode | SA, WCDMA, C2K , WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:CARRier:CPSD <real> [:SENSe] :SEMAsk:CARRier:CPSD? |
| Example | SEM:CARR:CPSD -80 SEM:CARR:CPSD? |
| Notes | Although the default value is defined, the value is recalculated by the measurement result just after completing the measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Dependencies | See Couplings |
| Couplings | This "PSD" parameter is coupled with the "Meas Type" parameter. The key will be active if the Meas Type is set to PSD. Otherwise, it is grayed out. |
| Preset | Measured carrier PSD reference power |
| State Saved | Saved in instrument state. |
| Min | -200 |
| Max | 200 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9064 |

Spectrum Peak

Sets the spectrum peak power in the carrier that is used to compute the relative power spectral density values for the offsets when Meas Type is set to Spectrum Peak. When the state is set to auto, this is set to the measured carrier spectrum peak power. When set to manual, the result takes on the last measured value, or can be manually entered

| | |
|------------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Ref Channel, Power Ref |

| | |
|--------------------------|--|
| Mode | SA, WCDMA, C2K , WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN |
| Remote Command | [:SENSe] :SEMAsk:CARRier:PEAK[:POWer] <real> [:SENSe] :SEMAsk:CARRier:PEAK[:POWer] ? |
| Example | SEM:CARR:PEAK -80 SEM:CARR:PEAK:POWER? |
| Notes | Although the default value is defined, the value is recalculated by the measurement result just after completing the measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Dependencies | See Couplings |
| Couplings | This "Spectrum Peak Ref" parameter is coupled with the "Meas Type" parameter. This softkey is active when the "Meas Type" is set to "Spectrum Peak Ref". Otherwise, grayout. |
| Preset | Measured carrier Spectrum Peak reference power |
| State Saved | Saved in instrument state. |
| Min | -200 |
| Max | 200 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9010 |

Offset/Limits

Accesses a menu that enables you to set up the measurement parameters for offset pairs. For example, you can assign the start and stop frequencies, select the resolution bandwidth, and set the time. When in the MSR and LTE-Advanced FDD/TDD mode, the softkey label changes to Outer Offset/Limits.

| | |
|--------------------------|-------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.14.00 |
| Help Map ID | 9065 |

Select Offset

Selects the offset (upper and lower) and displays the memory selection menu that enables you to store a set of parameter values for the offset, such as Start Freq, Stop Freq, Time, Res BW, Meas BW, Abs Start,

and Abs Stop. Only one selection at a time is shown on this menu key label.

| | |
|------------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Preset | A |
| Range | MSR, LTEATDD, LTEAFDD, WLAN: A B C D E F G H J K L Other modes without option N9060A-7FP: A B C D E F Other modes with option N9060A-7FP: A B C D E F G H J K L |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9019 |

Start Freq

Specifies the start frequency for the currently selected offset. Also enables you to toggle that offset between On and Off.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:FREQuency:STARt <freq>, ...</code> <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:FREQuency:STARt?</code> <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:STATe ON OFF 1 0, ...</code> <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:STATe?</code> |
| Example | <code>SEM:OFFS2:LIST:FREQ:STAR 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz</code> <code>SEM:OFFS2:LIST:FREQ:STAR?</code> <code>SEM:OFFS:LIST:STAT ON, ON, ON, OFF, OFF, OFF</code> <code>SEM:OFFS:LIST:STAT?</code> |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. |

| | |
|-----------|---|
| | <p>In the SA mode, Offset sub op code 1 is used for both BTS and MS.</p> <p>If the offset is outside of the frequency range, the result spectrum will be invalid.</p> <p>You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode.</p> |
| Couplings | <p>Coupled to Stop Freq. When the start freq goes above the stop freq, the stop freq is automatically adjusted to the start freq plus 100 Hz.</p> <p>If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25 W.</p> <p>If the current mode is ISDB-T, this value will be modified automatically according to the limit type.</p> |
| Preset | <p>For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows.</p> <p>SA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz</p> <p>WCDMA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz 2.515MHz, 4.000 MHz, 7.500 MHz, 8.500 MHz, 12.5 MHz, 15 MHz</p> <p>C2K: 750.0 kHz, 780.0 kHz, 1.980 MHz, 3.25 MHz, 7.0 MHz, 7.0 MHz 885 kHz, 1.980 MHz, 2.250 MHz, 8.0 MHz, 12.0 MHz, 12.0 MHz</p> <p>WIMAX OFDMA: 4.75 MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz, 24.75 MHz 4.75 MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz, 24.75 MHz</p> <p>TD-SCDMA:</p> <p>81 5kHz, 1015 kHz, 1815 kHz, 2.3 MHz, 2.3 MHz, 2.3 MHz, 815 kHz, 1.8 MHz, 2.9 MHz, 2.9 MHz, 2.9 MHz, 2.9 MHz</p> <p>1xEVDO: 750.0 kHz, 780.0 kHz, 1.98 MHz, 3.25 MHz, 7 MHz, 7 MHz 885.0 kHz, 1.98 MHz, 1.98 MHz , 1.98 MHz, 1.98 MHz, 1.98 MHz</p> <p>LTE, LTETDD: 50 kHz, 5.05 MHz, 10.5 MHz, 15.00 MHz, 30 MHz, 40 MHz 15.00 kHz, 1.5 MHz, 5.5 MHz, 6.5 MHz, 10 MHz, 20MHz</p> <p>When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.</p> <p>-----</p> <p>WLAN:</p> <p>if Radio Std is 802.11a/g(OFDM/DSSS-OFDM)/802.11n(20MHz): 9 MHz, 11 MHz, 20 MHz, 30 MHz, 50 MHz, 216 MHz, 216 MHz, 216 MHz, 216 MHz, 216 MHz, 216 MHz, 216 MHz</p> <p>if Radio Std is 802.11b/g(DSSS/CCK/PBCC): 11 MHz, 22 MHz, 50 MHz, 70 MHz, 90 MHz, 100 MHz , 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz</p> <p>if Radio Std is 802.11n(20MHz): 9 MHz, 11 MHz, 20 MHz, 30 MHz, 50 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz</p> <p>if Radio Std is 802.11n(40MHz): 19 MHz, 21 MHz, 40 MHz, 60 MHz, 100 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz</p> <p>if Radio Std is 802.11ac(20MHz): 9 MHz, 11 MHz, 20 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz, 30 MHz</p> <p>if Radio Std is 802.11ac(40MHz): 19 MHz, 21 MHz, 40 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz, 60 MHz</p> <p>if Radio Std is 802.11ac(80MHz): 39 MHz, 41 MHz, 80 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz</p> <p>if Radio Std is 802.11ac(160MHz): 79 MHz, 81 MHz, 160 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz</p> |

240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz
 if Radio Std is 802.11ac(80 MHz + 80MHz): 0MHz, 0 MHz, 40 MHz, 79 MHz, 159 MHz, 161 MHz, 200 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz, 240 MHz
 if Radio Std is 802.11ah(1MHz): 0.45 MHz, 0.6 MHz, 1 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz, 1.5 MHz
 if Radio Std is 802.11ah(2MHz): 0.9 MHz, 1.1 MHz, 2 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz
 if Radio Std is 802.11ah(4MHz): 1.9 MHz, 2.1 MHz, 4 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz, 6 MHz
 if Radio Std is 802.11ah(8MHz): 3.9 MHz, 4.1 MHz, 8 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz, 12 MHz, 120 MHz
 if Radio Std is 802.11ah(16MHz): 7.9 MHz, 8.1 MHz, 16 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz, 24 MHz
 if Radio Std is 802.11j/p(10MHz): 4.5 MHz, 5MHz, 5.5 MHz, 10 MHz, 15 MHz, 216 MHz, 216MHz, 216 MHz, 216MHz, 216MHz, 216MHz, 216MHz
 if Radio Std is 802.11p(5MHz): 2.25 MHz, 2.5MHz, 2.75 MHz, 5 MHz, 7.5 MHz, 216 MHz, 216MHz, 216 MHz, 216MHz, 216MHz, 216MHz, 216MHz
 For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows.
 SA: ON, ON, ON, ON, ON, OFF
 WCDMA: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, OFF, OFF
 C2K: ON, ON, ON, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF
 WIMAX OFDMA: ON, ON, ON, OFF, OFF, OFF|ON, ON, ON, OFF, OFF, OFF
 TD-SCDMA: ON, ON, ON, ON, OFF, OFF|ON, ON, ON, OFF, OFF, OFF
 1xEVDO: ON, ON, ON, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF
 LTE, LTEATDD: ON, ON, ON, OFF, OFF, OFF|ON, ON, ON, ON, OFF, OFF
 When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.

 WLAN:
 if Radio Std is 802.11b/g(DSSS/CCK/PBCC): ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF

| | |
|--------------------------|---|
| State Saved | Saved in instrument state. |
| Min | 0 Hz |
| Max | Depends on instrument maximum frequency. It's always Offset Stop Freq (100 Hz) |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00, A.16.00 |
| Help Map ID | 9020 |

Stop Freq

Specifies the stop frequency for the currently selected offset.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------------------------|---|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:FREQuency:STOP <freq>, ... [:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:FREQuency:STOP? |
| Example | SEM:OFFS:LIST:FREQ:STOP 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz, 15.0 MHz SEM:OFFS:LIST:FREQ:STOP? |

Notes

Comma separated list of values.

OFFSet1 is for BTS, 2 for MS. Default is BTS.

Note that Offset sub op code 2 is supported only in Non-SA modes.

In the SA mode, Offset sub op code 1 is used for both BTS and MS.

If the offset is outside of the frequency range, the result spectrum will be invalid.

You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode.

| | |
|-----------|---|
| Couplings | Coupled to Start Freq. When the stop freq goes below the start freq, the start freq is automatically adjusted to the stop freq minus 100 Hz. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25 W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type. |
|-----------|---|

| | |
|--------|---|
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA: 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz, 15.0 MHz WCDMA:2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz, 15.0 MHz 3.485 MHz, 7.500 MHz, 8.500 MHz, 12.00 MHz, 15.00 MHz, 18.0 MHz C2K: 780.0kHz, 1.980 MHz, 4.0 MHz, 4.0 MHz, 12.0 MHz, 12.0 MHz 1.980 MHz, 4.0 MHz, 4.0 MHz, 11.5 MHz, 14.5 MHz, 14.5 MHz WIMAX OFDMA: 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz, 24.75 MHz, 29.75 MHz 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz, 24.75 MHz, 29.75 MHz TD-SCDMA: 1015 kHz, 1815kHz, 2.3 MHz, 4 MHz, 4 MHz, 4 MHz 1.8 MHz, 2385 kHz, 3.5 MHz, 3.5 MHz , 3.5 MHz , 3.5 MHz 1xEVDO: 780.0 kHz, 1.98 MHz, 4.0 MHz, 4.0 MHz, 12 MHz, 12 MHz 1.98 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz, 4.0 MHz When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset |
|--------|---|

F value.

WLAN:

if Radio Std is 802.11 a/g(OFDM/DSSS-OFDM)/802.11n(20MHz): 11 MHz, 20 MHz, 30 MHz, 50 MHz, 100 MHz, 250 MHz, 250 MHz, 250 MHz, 250 MHz, 250 MHz, 250 MHz, 250 MHz

if Radio Std is 802.11 b/g(DSSS/CCK/PBCC): 22 MHz, 50 MHz, 70 MHz, 90 MHz, 100 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz, 120 MHz

if Radio Std is 802.11n(20MHz): 11 MHz, 20 MHz, 30 MHz, 50 MHz, 100 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz

if Radio Std is 802.11n(40MHz): 21 MHz, 40 MHz, 60 MHz, 100 MHz, 200 MHz, 300 MHz, 300 MHz, 300 MHz, 300 MHz, 300 MHz, 300 MHz, 300 MHz

if Radio Std is 802.11 ac(20MHz): 11 MHz, 20 MHz, 30 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz

if Radio Std is 802.11 ac(40MHz): 21 MHz, 40 MHz, 60 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz, 100 MHz

if Radio Std is 802.11 ac(80MHz): 41 MHz, 80 MHz, 120 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz, 200 MHz

if Radio Std is 802.11 ac(160MHz): 81 MHz, 160 MHz, 240 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz, 400 MHz

if Radio Std is 802.11 ac(80 MHz + 80MHz): 100MHz, 40 MHz, 79 MHz, 81 MHz, 161 MHz, 200 MHz, 240 MHz, 260 MHz, 260 MHz, 260 MHz, 260 MHz, 260 MHz

if Radio Std is 802.11 ah(1MHz): 0.6MHz, 1 MHz, 1.5 MHz, 2.5MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz, 2.5 MHz

if Radio Std is 802.11 ah(2MHz): 1.1 MHz, 2 MHz, 3 MHz, 5MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz

if Radio Std is 802.11 ah(4MHz): 2.1 MHz, 4 MHz, 6 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz

if Radio Std is 802.11 ah(8MHz): 4.1 MHz, 8 MHz, 12 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz, 20 MHz

if Radio Std is 802.11 ah(16MHz): 8.1 MHz, 16 MHz, 24 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz

if Radio Std is 802.11 j/p(20MHz): 10MHz, 11 MHz, 20 MHz, 30 MHz, 50MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz, 50 MHz

if Radio Std is 802.11 j/p(10MHz): 5MHz, 5.5 MHz, 10 MHz, 15 MHz, 25MHz, 250MHz, 250MHz, 250MHz, 250 MHz, 250MHz, 250MHz, 250MHz

if Radio Std is 802.11 p(5MHz): 2.5MHz, 2.75MHz, 5 MHz, 7.5 MHz, 12.5MHz, 250MHz, 250MHz, 250MHz, 250 MHz, 250MHz, 250MHz, 250MHz

| | |
|----------------------|--|
| State Saved | Saved in instrument state. |
| Min | 100 Hz |
| Max | Depends on instrument maximum frequency. Same as the Max Span on Swept SA Measurement. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00, A.16.00 |

| | |
|--------------|------|
| S/W Revision | |
| Help Map ID | 9021 |

Sweep Time

Specifies the time for the currently selected offset and enables you to toggle the Time mode between Auto and Man.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:SWEep:TIME <time>, ... [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:SWEep:TIME? [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:SWEep:TIME:AUTO ON OFF 1 0, ... [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:SWEep:TIME:AUTO? |
| Example | SEM:OFFS2:LIST:SWE:TIME 1.0 ms, 3.4 ms, 2.08 ms, 1.0 ms, 1.0 ms, 1.0 ms SEM:OFFS2:LIST:SWE:TIME? SEM:OFFS2:LIST:SWE:TIME:AUTO ON, ON, ON, ON, OFF, OFF SEM:OFFS2:LIST:SWE:TIME:AUTO? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | When the time is set manually, Time Mode is set to MANual. If the current mode is DVB-T/H, this value will be modified automatically according to the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type. |
| Preset | Automatically calculated Modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP: ON, ON, ON, ON, ON, ON Modes (except MSR, LTEAFDD, LTEATDD and WLAN) with option N9060A-7FP: ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON WLAN: ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON |

| | |
|-------------------------------------|--|
| State Saved | Saved in instrument state. |
| Min | X-Series HW: Depends on Sweep Type Sweep Type "Swept": 1 ms Sweep Type "FFT": 100ns E6630A_E6640A_M90XA:TBD E7515A: 39.2 usec |
| Max | 4000 s |
| Backwards Compatibility SCPI | [:SENSe] :SEMask:OFFSet [1] 2 :LIST:SWEep [:TIME] |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00, A.16.00 |
| Help Map ID | 9025 |

Offset Side

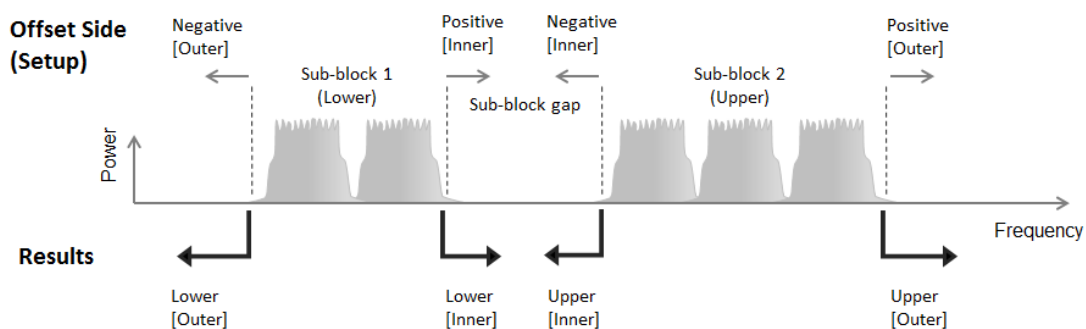
Specifies which offset side to measure.

You can turn off (not use) specific offsets with [:SENSe]:SEMask:OFFSet[n][:OUTer]:LIST:STATe.

- **BOTH** – Both of the negative (lower) and positive (upper) sidebands
- **NEGative** – Negative (lower) sideband only
- **POSitive** – Positive (upper) sideband only

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

The figure below shows the relation between the negative/positive offset side setups and the upper/lower results in the MSR and LTE-Advanced FDD/TDD.



parameter_ 54.42177

| | |
|--------------------------|---|
| table_24.18745 | |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | <code>[:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:SIDE BOTH NEGative POSitive, ...</code> <code>[:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:SIDE?</code> |
| Example | SEM:OFFS:LIST:SIDE BOTH, NEG, NEG, POS, POS, POS SEM:OFFS:LIST:SIDE? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | Modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP: BOTH, BOTH, BOTH, BOTH, BOTH, BOTH Modes (except MSR, LTEAFDD, LTEATDD and WLAN) with option N9060A-7FP: BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH WLAN: BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH |
| State Saved | Saved in instrument state. |
| Range | Neg Both Pos |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9023 |

Res BW

Specifies which Resolution BW filter to use when measuring the currently selected offset.

Offset Res BW Mode allows the instrument to determine the optimum Resolution BW filter to use when measuring the currently selected offset.. When changing the Meas BW parameter, if the Res BW needs to be changed to adhere to the rule

$(N \times \text{Res BW}) \leq (\text{Stop freq of the offset} - \text{Start freq of the offset}),$

where N is the multiplier, this setting will automatically be changed to manual.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|------------|-----------------|
| parameter_ | 54.42177 |
| table_ | |

| | |
|----------------|--|
| 24.18745 | |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO mode, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:BANDwidth[:RESolution] <bandwidth>, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:BANDwidth[:RESolution]? [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO OFF ON 1 0, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO? |
| Example | SEM:OFFS2:LIST:BAND 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz, 1.00 MHz, 1.00 MHz SEM:OFFS2:LIST:BAND? SEM:OFFS:LIST:BAND:AUTO 1,1,1,1,1,1 SEM:OFFS:LIST:BAND:AUTO? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | Coupled to Start and Stop offset and Meas BW multiplier. This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the multiplier is changed, the Res BW will be changed to ensure this. When set manually, Res BW Coupling is set to manual. The resolution bandwidth is coupled to the offset width determined by the start frequency and stop frequency. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA: 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz, 1.00 MHz, 1.00 MHz WCDMA: 30.00 kHz, 30.00 kHz, 30.00 kHz, 100.00 kHz, 1.000 MHz, 1.00 MHz 30.00 kHz, 1.000 MHz, 1.000 MHz, 1.000 MHz, 1.00 MHz C2K: 3.00 kHz, 30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.00 MHz 30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.000 MHz, 1.00 MHz WIMAX OFDMA: 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz TD-SCDMA: 30 kHz, 30 kHz, 30 kHz, 50 kHz, 1 MHz, 1 MHz 30 kHz, 30 kHz, 50 kHz, 1 MHz, 1 MHz, 1 MHz 1xEVDO: 30.00 kHz, 30.00 kHz, 30.00 kHz, 6.2 kHz, 1.000 MHz, 1.000 MHz 30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz, 30.00 kHz LTE, LTE-TDD: 51 kHz, 100 kHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz 15.0 kHz, 510 kHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value. ----- WLAN: If radio std is 802.11ah: 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 KHz, 10 |

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| | <p>KHz, 10 KHz, 10 KHz</p> <p>For other radio std: 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz</p> <p>Modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP: OFF, OFF, OFF, OFF, OFF, OFF OFF, OFF, OFF, OFF, OFF, OFF</p> <p>Modes (except MSR, LTEAFDD, LTEATDD and WLAN) with option N9060A-7FP: OFF, OFF</p> <p>WLAN: OFF, OFF</p> |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 8 MHz |
| Backwards Compatibility SCPI | [:SENSe] :SEMAsk:OFFSet [1] 2 :LIST:BWIDth[:RESolution] |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9026 |

Meas BW

Allows you to specify a multiplier of Res BW for the measurement integration bandwidth.

Meas BW is multiplier integer number. It shows a ratio between Integration BW and Resolution BW of the measurement result.

$$\text{Integ BW} = \text{Meas BW} * \text{Resolution BW}$$

Integration BW is desired resolution bandwidth and Resolution BW is actual bandwidth for sweep. Measurement sweeps with Resolution BW and Meas BW compensates sweep resolution bandwidth to Integration BW.

If you set this parameter greater than 1, you can set Resolution BW narrower to avoid carrier power leakage effect to the offset power integration.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/HISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN |

| | |
|-------------------------------------|--|
| Remote Command | <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:Bandwidth:IMULti <integer>, ...</code> <code>[:SENSe] :SEMAsk:OFFSet [1] 2 [:OUTer] :LIST:Bandwidth:IMULti?</code> |
| Example | SEM:OFFS2:LIST:BAND:IMUL 1,1,1,1,1 SEM:OFFS2:LIST:BAND:IMUL? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the Res Bw is changed, the multiplier will be changed to ensure this. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA: 1, 1, 1, 1, 1, 1 WCDMA: 1, 1, 1, 10, 1, 1 1, 1, 1, 1, 1, 1 C2K: 10, 1, 1, 1, 1, 1 1, 1, 1, 1, 1, 1 WIMAX OFDMA, 1xEVDO: 1, 1, 1, 1, 1, 1 1, 1, 1, 1, 1, 1 TD-SCDMA:1, 1, 1, 20, 1, 1 1, 1, 20, 1, 1, 1 LTE, LTETDD: 2, 1, 1, 1, 1, 1 2, 2, 1, 1, 1, 1 When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value. ----- WLAN: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 1000 |
| Backwards Compatibility SCPI | <code>[:SENSe] :SEMAsk:OFFSet [1] 2 :LIST:BWIDth:IMULti</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9024 |

Video BW

Changes the analyzer post-detection filter.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|------------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAXOFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo <freq>, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo? [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO OFF ON 0 1, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO? |
| Example | SEM:OFFS2:LIST:BAND:VID 3.00 kHz, 3.00 kHz, 3.00 kHz, 100.0 kHz, 100.0 kHz, 100.0 kHz SEM:OFFS2:LIST:BAND:VID? SEM:OFFS2:LIST:BAND:VID:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:AUTO? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | ISDB-T: 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz, 1.0kHz Other than ISDB-T: Automatically Calculated Modes (except MSR, LTEAFDD, LTEATDD, WLAN, ISDB-T) without option N9060A-7FP: ON, ON, ON, ON, ON, ON ON, ON, ON, ON, ON, ON Modes (except MSR, LTEAFDD, LTEATDD, WLAN, ISDB-T) with option N9060A-7FP:ON, ON ----- WLAN: ON, ON |
| State Saved | Saved in instrument state. |
| Min | 1 Hz |
| Max | 50 MHz |
| Backwards Compatibility SCPI | [:SENSe]:SEMAsk:OFFSet[1] 2:LIST:BWIDth:VIDeo |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9027 |

VBW/RBW

Selects the ratio between the video and resolution bandwidths.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:RATio <real>, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:RATio? [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO OFF ON 0 1, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO? |
| Example | SEM:OFFS2:LIST:BAND:VID:RAT 0.1, 0.1, 0.1, 0.1, 0.1, 0.1 SEM:OFFS2:LIST:BAND:VID:RAT? SEM:OFFS2:LIST:BAND:VID:RAT:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:RAT:AUTO? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA, WCDMA, C2K, LTE, LTETDD: 0.01, 0.01, 0.01, 0.01, 0.01, 0.01 0.01, 0.01, 0.01, 0.01, 0.01, 0.01 WIMAX OFDMA: 0.3, 0.3, 0.3, 0.3, 0.3, 0.3 TD-SCDMA: 10, 10, 10, 10, 1, 1 10, 10, 10, 1, 1, 1 1xEVDO: 10, 10, 10, 10, 10, 10 10, 10, 10, 10, 10, 10 When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value. ----- WLAN: If radio std is 802.11ah: 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10 For other radio std: 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3, 0.3 Modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP: OFF, OFF, OFF, OFF, OFF, OFF OFF, OFF, OFF, OFF, OFF, OFF Modes (except MSR, LTEAFDD, LTEATDD and WLAN) with option N9060A-7FP: OFF, OFF |

| | |
|--------------------------|---|
| | WLAN: OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF |
| State Saved | Saved in instrument state. |
| Min | 0.00001 |
| Max | 3000000 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9028 |

Limits

Accesses a menu that enables you to set the power limits for start and stop frequencies of the selected offsets.

| | |
|--------------------------|-------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9066 |

Select Offset

Selects the offset (upper and lower) and displays the memory selection menu that enables you to store a set of parameter values for the offset, such as Start Freq, Stop Freq, Time, Res BW, Meas BW, Abs Start, and Abs Stop. Only one selection at a time is shown on this menu key label.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Preset | A |
| Range | MSR, LTEATDD, LTEAFDD, WLAN: A B C D E F G H J K L Other modes without option N9060A-7FP: A B C D E F Other modes with option N9060A-7FP: A B C D E F G H J K L |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9019 |

Abs Start

Sets the absolute power level limit at the start frequency for the selected offset. The absolute power level limit ranges from -200 to +50 dBm.

The fail condition for each offset channel is set remotely by [:SENSE]:SEMask:OFFSet[n][:OUTer]:LIST:TEST.

You can turn off (not use) specific offset channels remotely with [:SENSE]:SEMask:OFFSet[n][:OUTer]:LIST:STATe.

The SCPI query returns values currently set to the absolute power test limits.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------|--|
| parameter_ | 54.42177 |
| table_ | |
| 24.18745 | |
| Key Path | Meas Setup, Offset/Limit, Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTE-TDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STARt:ABSolute <real>, ... [:SENSE]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STARt:ABSolute? |
| Example | SEM:OFFS2:LIST:STAR:ABS -12.50 dBm, -12.50 dBm, -24.50 dBm, -11.50 dBm, -11.50 dBm, -11.50 dBm SEM:OFFS2:LIST:STAR:ABS? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA, WIMAX OFDMA: -14.00 dBm, -14.00 dBm, -26.00 dBm, -13.00 dBm, -13.00 dBm, -13.00 dBm WCDMA: -12.50 dBm, -12.50 dBm, -24.50 dBm, -11.50 dBm, -11.50 dBm, -11.50 dBm -69.6 dBm, -54.3 dBm, -54.3 dBm, -54.3 dBm, -54.3 dBm C2K: -27.00 dBm, -27.00 dBm, -27.00 dBm, -46.00 dBm, -13.00 dBm, -13.00 dBm -70.13 dBm, -70.13 dBm, -35.00 dBm, -13.00 dBm, -13.00 dBm, -13.00 dBm TD-SCDMA: -28 dBm, -28 dBm, -36 dBm, -21 dBm, -21 dBm, -21 dBm -71.3 dBm, -71.3 dBm, -56.07 dBm, -56.07 dBm, -56.07 dBm 1xEVDO: -27.0dBm, -27.00 dBm, -27.00 dBm, -46.00 dBm, -13.00 dBm, -13.00 dBm -70.13 dBm, -70.13 dBm, -70.13 dBm, -70.13 dBm, -70.13 dBm, -70.13 dBm |

LTE, LTETDD: -5.5 dBm, -12.5 dBm, -15.0 dBm, -15.0 dBm, -15.0 dBm, -15.0 dBm|-13.5 dBm, -8.5 dBm, -11.5 dBm, -23.5 dBm, -23.5 dBm, -23.5 dBm

When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.

WLAN:

if Radio Std is 802.11b/g(DSSS/CCK/PBCC): -10 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm

if Radio Std is 802.11a/g(OFDM/DSSS-OFDM), 802.11n(20MHz) or 802.11ac(20MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm

if Radio Std is 802.11n(40MHz) or 802.11ac(40MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm

if Radio Std is 802.11ac(80MHz/160MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11ac (80 MHz + 80 MHz): -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11ah(1MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm

if Radio Std is 802.11ah(2MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm

if Radio Std is 802.11ah(4MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm

if Radio Std is 802.11ah(8MHz/16MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11j/p(20MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm

if Radio Std is 802.11j/p(10MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm

if Radio Std is 802.11p(5MHz): 16.00 dBm, -4.00 dBm, -12.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm

| | |
|--------------------------|---|
| State Saved | Saved in instrument state. |
| Min | -200 dBm |
| Max | 50 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9029 |

Abs Stop

Sets the absolute power level limit at the stop frequency for the selected offset. The absolute power level limit ranges from -200 to +50 dBm. You can also toggle this function between couple and manual. If set to Couple, the **Abs Stop** power level limit is coupled to **Abs Start** to result in a flat limit line. If set to Man, Abs Start and Abs Stop take different values to result in a sloped limit line.

The SCPI query returns values currently set to the offset stop absolute power limits.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits, Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTEATDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:ABSolute <real>, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:ABSolute? [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:ABSolute:COUPle ON OFF 1 0, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:ABSolute:COUPle? |
| Example | SEM:OFFS:LIST:STOP:ABS -12.50 dBm, -24.50 dBm, -24.50 dBm, -11.50 dBm, -11.50 dBm, -11.50 dBm SEM:OFFS1:LIST:STOP:ABS? SEM:OFFS:LIST:STOP:ABS:COUP ON, OFF, ON, ON, ON, ON SEM:OFFS:LIST:STOP:ABS:COUP? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Couplings | Coupled to Abs Start if "Auto" is selected, that is, the Stop value is equal to the Start value. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA, WIMAX OFDMA: -14.00 dBm, -26.00 dBm, -26.00 dBm, -13.00 dBm, -13.00 dBm, -13.00 dBm WCDMA: -12.50 dBm, -24.50 dBm, -24.50 dBm, -11.50 dBm, -11.50 dBm, -11.50 dBm -69.6 dBm, -54.3 dBm, -54.3 dBm, -54.3 dBm, -54.3 dBm C2K: -27.00 dBm, -27.00 dBm, -27.00 dBm, -46.00 dBm, -13.00 dBm, -13.00 dBm -70.13 dBm, -70.13 dBm, -35.00 dBm, -13.00 dBm, -13.00 dBm, -13.00 dBm TD-SCDMA: -28 dBm, -36 dBm, -36 dBm, -21 dBm, -21 dBm, -21 dBm -71.3 dBm, -71.3 dBm, -56.07 dBm, |

-56.07 dBm, -56.07 dBm, -56.07 dBm

1xEVDO: -27dBm, -27.00 dBm, -27.00 dBm, -46.00 dBm, -13.00 dBm, -13.00 dBm|-70.13 dBm, -70.13 dBm, -70.13 dBm, -70.13 dBm, -70.13 dBm

LTE, LTE-TDD: -12.5 dBm, -12.5 dBm, -15.0 dBm, -15.0 dBm, -15.0 dBm, -15.0 dBm|-13.5 dBm, -8.5 dBm, -11.5 dBm, -23.5 dBm, -23.5 dBm, -23.5 dBm

When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.

WLAN:

if Radio Std is 802.11 b/g(DSSS/CCK/PBCC): -10 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm, -30 dBm

if Radio Std is 802.11 a/g(OFDM/DSSS-OFDM), 802.11 n(20MHz) or 802.11 ac(20MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm

if Radio Std is 802.11 n(40MHz) or 802.11 ac(40MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm

if Radio Std is 802.11 ac(80MHz/160MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11 ac (80 + 80 MHz): -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11 ah(1MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm

if Radio Std is 802.11 ah(2MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm, -63.00 dBm

if Radio Std is 802.11 ah(4MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm, -66.00 dBm

if Radio Std is 802.11 ah(8MHz/16MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm, -69.00 dBm

if Radio Std is 802.11 j/p(10MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm, -60.00 dBm

if Radio Std is 802.11 j/p(5MHz): -4.00 dBm, -12.00 dBm, -24.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm, -57.00 dBm

For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows.

SA,WIMAX OFDMA: ON, OFF, ON, ON, ON, ON

WCDMA: ON, OFF, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON

C2K: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF

TD-SCDMA: ON, OFF, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON

1xEVDO: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF

LTE, LTE-TDD: OFF, ON, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON

When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.

WLAN:

| | |
|--------------------------|---|
| | if Radio Std is 802.11a/g(OFDM/DSSS-OFDM)/802.11n(20MHz/40MHz)/802.11 ac (20MHz/40MHz/80MHz/160MHz) or 802.11ah(1MHz/2MHz/4MHz/8MHz/16MHz): OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON |
| | if Radio Std is 802.11 ac(80+80 MHz): ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON |
| | if Radio Std is 802.11b/g(DSSS/CCK/PBCC): ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON |
| | if Radio Std is 802.11j/p 20M, j/p 10M, p5M : OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON |
| State Saved | Saved in instrument state. |
| Min | -200 dBm |
| Max | 50 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9030 |

Rel Start

Sets a relative power level limit at the start frequency for the selected offset. The relative power level limit ranges from -200 to +50 dBc.

The fail condition is set remotely by [:SENSe]:SEMAsk:OFFSet[n][:OUTer]:LIST:TEST for each offset channel test.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMAsk:OFFSet[n][:OUTer]:LIST:STATe.

The SCPI query returns values currently set to the relative power test limits.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits, Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:STARt:RCARrier <rel_ampl>, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:STARt:RCARrier? |
| Example | SEM:OFFS:LIST:STAR:RCAR -30, -30, -30, -30, -30, -30 SEM:OFFS:LIST:STAR:RCAR? |
| Notes | Comma separated list of values. |

| | |
|-----------|--|
| | <p>OFFSet1 is for BTS, 2 for MS. Default is BTS.</p> <p>Note that Offset sub op code 2 is supported only in Non-SA modes.</p> <p>In the SA mode, Offset sub op code 1 is used for both BTS and MS.</p> <p>You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode.</p> |
| Couplings | <p>If the current mode is DVB-T/H, this value will be modified automatically according to the limit type the output power of the transmitter which is less or more than 25W.</p> <p>If the current mode is ISDB-T, this value will be modified automatically according to the limit type.</p> <p>If the current mode is WLAN and radio std is 802.11n, Rel Start limits will be set to following values when frequency changed to above 5GHz: 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB</p> |
| Preset | <p>For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows.</p> <p>SA: -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB</p> <p>WCDMA: -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB -33.73 dB, -34.00 dB, -37.50 dB, -47.50 dB, -47.50 dB, -47.50 dB</p> <p>C2K: -45.00 dB, -45.00 dB, -55.00 dB, -55.00 dB, -55.00 dB, -55.00 dB -42.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB</p> <p>WIMAX OFDMA: 0 dB, -25 dB, -32 dB, -50 dB, -50 dB, -50 dB</p> <p>TD-SCDMA: -54.00 dB, -54.00 dB, -62.00 dB, -47.00 dB, -47.00 dB, -47.00 dB -35.21 dB, -49.00 dB, -44.00 dB, -44.00 dB, -44.00 dB, -44.00 dB</p> <p>1xEVDO: -45dBc, -45.00 dB, -55.00 dB, -55.00 dB, -55.00 dB, -55.00 dB -42dBc, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB</p> <p>LTE, LTETDD: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB</p> <p>Digital Cable TV: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB</p> <p>When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value.</p> <p>-----</p> <p>WLAN:</p> <p>if Radio Std is 802.11 a/g(OFDM/DSSS-OFDM): 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB</p> <p>if Radio Std is 802.11 b/g(DSSS/CCK/PBCC): -30 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB</p> <p>if Radio Std is 802.11 n(20MHz/40MHz): 0 dB, -20.00 dB, -28.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB</p> <p>if Radio Std is 802.11 ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB</p> <p>if Radio Std is 802.11 ac(80 MHz + 80MHz): -40dB, -40.00 dB, -28.00 dB, -20 dB, 0 dB, -20 dB, -28 dB, -40 dB, -40 dB, -40.00 dB, -40.00 dB</p> <p>if Radio Std is 802.11 ah (1 MHz/2 MHz/ 4 MHz/ 8 MHz/ 16 MHz): 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB</p> <p>if Radio Std is 802.11 j/p 20M, j/p 10M, p5M: 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB</p> |

| | |
|--------------------------|--|
| | -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB |
| State Saved | Saved in instrument state. |
| Min | -200 dB |
| Max | 50 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9031 |

Rel Stop

Sets a relative power level limit at the stop frequency for the selected offset. The relative power level limit ranges from -200 to +50 dBc.

The fail condition is set remotely by [:SENSe]:SEMask:OFFSet[n][:OUTer]:LIST:TEST for each offset channel.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMask:OFFSet[n][:OUTer]:LIST:STATe.

The SCPI query returns values currently set to the offset stop relative power limits.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | Meas Setup, Offset/Limits, Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:RCARrier <rel_ampl>, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:RCARrier? [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:RCARrier:COUPle ON OFF 1 0, ... [:SENSe]:SEMask:OFFSet[1] 2[:OUTer]:LIST:STOP:RCARrier:COUPle? |
| Example | SEM:OFFS:LIST:STOP:RCAR -30, -30, -30, -30, -30, -30 SEM:OFFS:LIST:STOP:RCAR? SEM:OFFS:LIST:STOP:RCAR:COUP ON, ON, ON, ON, ON, ON SEM:OFFS:LIST:STOP:RCAR:COUP? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. |

| | |
|--|---|
| | <p>Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode.</p> |
|--|---|

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|-----------|--|
| Couplings | <p>Coupled to Rel Start if "Auto" is selected, that is, Start is made the same as Stop. If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. If the current mode is ISDB-T, this value will be modified automatically according to the limit type. If the current mode is WLAN and radio std is 802.11n, Rel Stop limits will be set to following values when frequency changed to above 5GHz: -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB</p> |
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| | |
|--------|---|
| Preset | <p>For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA: -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB WCDMA: -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB, -30.00 dB -48.28 dB, -37.50 dB, -47.50 dB, -47.50 dB, -47.50 dB, -47.50 dB C2K: -45.00 dB, -45.00 dB, -55.00 dB, -55.00 dB, -55.00 dB, -55.00 dB -42.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB WIMAX OFDMA: -25 dB, -32 dB, -50 dB, -50 dB, -50 dB, -50 dB TD-SCDMA: -54.00 dB, -62.00 dB, -62.00 dB, -47.00 dB, -47.00 dB, -47.00 dB -49.00 dB, -58.945 dB, -44.00 dB, -44.00 dB, -44.00 dB, -44.00 dB 1xEVDO: -45dB, -45.00 dB, -55.00 dB, -55.00 dB, -55.00 dB, -55.00 dB -42dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB, -54.00 dB LTE, LTETDD: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB Digital Cable TV: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value. ----- WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM): -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB if Radio Std is 802.11b/g(DSSS/CCK/PBCC): -30 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB, -50 dB if Radio Std is 802.11n(20MHz/40MHz): -20.00 dB, -28.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB, -45.00 dB if Radio Std is 802.11ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB if Radio Std is 802.11ac(80 MHz + 80MHz): -40dB, -28.00 dB, -20.00 dB, 0 dB, -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB if Radio Std is 802.11ah (1MHz/2 MHz/ 4 MHz/ 8 MHz/ 16 MHz): -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB if Radio Std is 802.11 j/p 10M, p5M: -20.00 dB, -28.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -40.00 dB, -47.00 dB, -</p> |
|--------|---|

47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB, -47.00 dB
 For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows.
 For modes (except MSR, LTEAFDD, LTEATDD and WLAN) with option N9060A-7FP, the preset value of Offset G ~ L is the same as the Offset F value.
 SA: ON, ON, ON, ON, ON, ON, ON
 WCDMA: ON, ON, ON, ON, ON, ON, ON|OFF, OFF, OFF, ON, ON, ON
 C2K: ON, ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF
 WIMAX OFDMA: OFF, OFF, OFF, ON, ON, ON|OFF, OFF, OFF, ON, ON, ON
 TD-SCDMA: ON, OFF, ON, ON, ON, ON|OFF, OFF, ON, ON, ON, ON
 1xEVDO: ON, ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF
 LTE, LTETDD: ON, ON, ON, ON, ON, ON
 Digital Cable TV: OFF, OFF, OFF, OFF, OFF, OFF

 WLAN:
 if Radio Std is 802.11 a/g(OFDM/DSSS-OFDM)/802.11n(20MHz/40MHz): OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON
 if Radio Std is 802.11 b/g(DSSS/CCK/PBCC): ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON
 if Radio Std is 802.11 ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON
 if Radio Std is 802.11 ac(80 MHz + 80MHz): OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF
 if Radio Std is 802.11 ah (1 MHz/2 MHz/ 4 MHz/ 8 MHz/ 16 MHz): OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON
 if Radio Std is 802.11j/p 20M j/p 10M p5M: OFF, OFF, OFF, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON

| | |
|--------------------------|---|
| State Saved | Saved in instrument state. |
| Min | -200 dB |
| Max | 50 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9032 |

Fail Mask

Selects one of the logic keys for fail conditions between the measurement results and the test limits:

- **Absolute** and **Relative** both check the results against the respective limit.
- **OR** checks against both limits, failing if either of the limits is broken.
- **AND** will only display a fail if both of the limits are broken.

The absolute or relative power limit value for each offset channel can be set remotely with
[:SENSe]:SEMAsk:OFFSet[n][:OUTer]:LIST:ABSolute or [:SENSe]:SEMAsk:OFFSet[n]
[:OUTer]:LIST:RCARrier.

You can turn off (not use) specific offset channels remotely with [:SENSe]:SEMAsk:OFFSet[n]
[:OUTer]:LIST:STATe.

Missing values are not permitted; that is, if you want to change values 2 and 6, you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 12 values.

| | |
|----------------|--|
| parameter_ | 54.42177 |
| table_24.18745 | |
| Key Path | Meas Setup, Offset/Limits, Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:TEST ABSolute AND OR RELative, ... [:SENSe]:SEMAsk:OFFSet[1] 2[:OUTer]:LIST:TEST? |
| Example | SEM:OFFS:LIST:TEST ABS, ABS, ABS, ABS, ABS, ABS SEM:OFFS:LIST:TEST? |
| Notes | Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | None If the current mode is DVB-T/H, this value will be modified automatically according to the limit type and the output power of the transmitter which is less or more than 25W. |
| Preset | For modes (except MSR, LTEAFDD, LTEATDD and WLAN) without option N9060A-7FP, the preset value is as follows. SA: ABS, ABS, ABS, ABS, ABS, ABS WCDMA: ABS, ABS, ABS, ABS, ABS, ABS AND, AND, AND, AND, AND, AND C2K: REL, REL, REL, ABS, REL, REL AND, AND, ABS, REL, REL, REL WIMAX OFDMA: REL, REL, REL, REL, REL, REL REL, REL, REL, REL, REL, REL TD-SCDMA: ABS, ABS, ABS, ABS, ABS, ABS AND, AND, AND, AND, AND, AND 1xEVDO: REL, REL, REL, ABS, REL, REL AND, AND, AND, OR, AND, AND LTE, LTETDD: ABS, ABS, ABS, ABS, ABS, ABS Digital Cable TV: REL, REL, REL, REL, REL, REL REL, REL, REL, REL, REL, REL When option N9060A-7FP is installed in these modes, the preset value of Offset G ~ L is the same as the Offset F value. ----- WLAN: |

| | |
|--------------------------|--|
| | if Radio Std is 802.11b/g(DSSS/CCK/PBCC): REL, REL, REL, REL, REL, REL, REL, REL, REL, REL, REL, REL, REL if Radio Std is 802.11a/g(OFDM/DSSS-OFDM) or 802.11n(20MHz/40MHz): REL, REL, REL, AND, AND, AND, AND, AND, AND, AND, AND, AND if Radio Std is 802.11ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): REL, REL, REL, AND, AND, AND, AND, AND, AND, AND, AND, AND, AND if Radio Std is 802.11ac (80 MHz + 80MHz): AND, REL, REL, REL, REL, REL, REL, AND, AND, AND, AND, AND if Radio Std is 802.11ah (1MHz/2 MHz/ 4 MHz/ 8 MHz/ 16 MHz): REL, REL, REL, AND, AND, AND, AND, AND, AND, AND, AND, AND, AND if Radio Std is 802.11j/p 10M, p5M: REL, REL, REL, AND, AND, AND, AND, AND, AND, AND, AND, AND, AND, AND |
| State Saved | Saved in instrument state. |
| Range | Absolute Relative Abs AND Rel Abs OR Rel |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00, A.11.00, A.14.00 |
| Help Map ID | 9033 |

Offset Freq Define

This key enables you to select “Offset” definition. Each standard defines each “Offset” from Carrier.

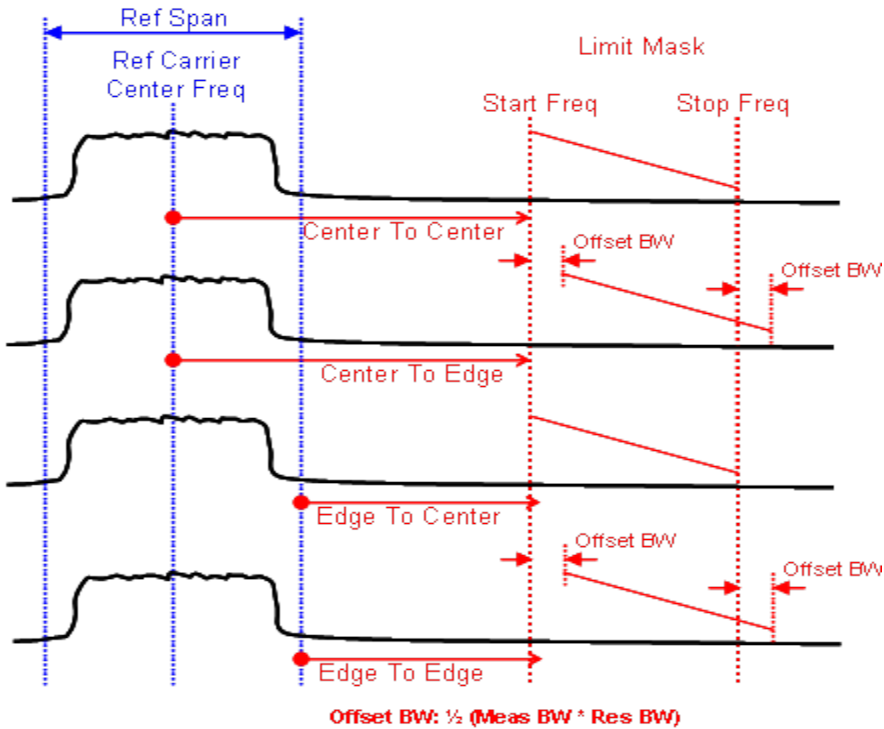
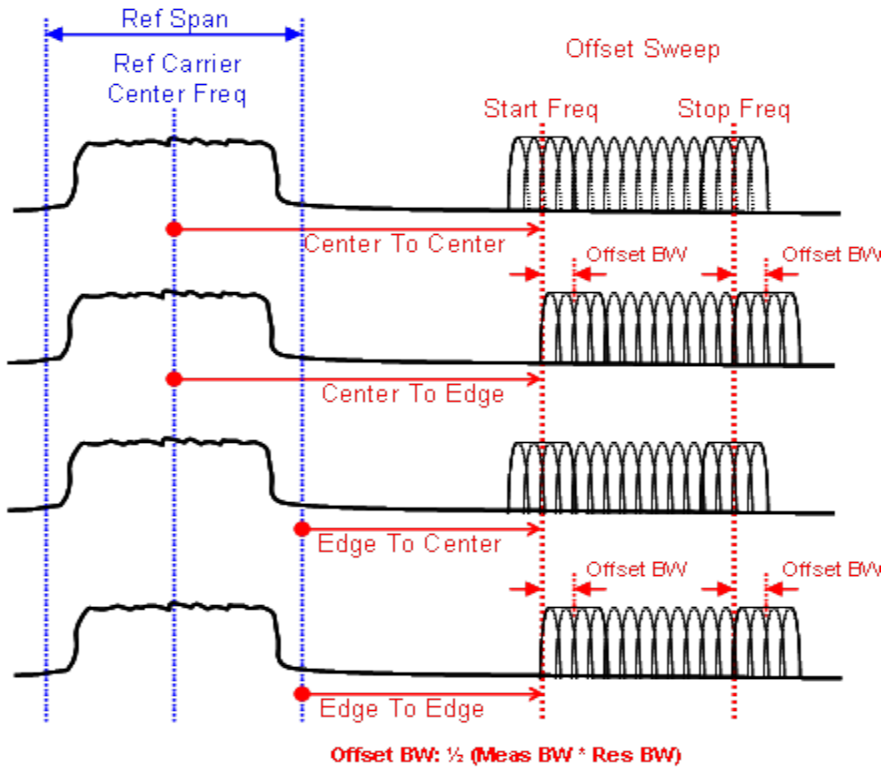
Meas BW Edge means the edge of resolution band width that is represented by Meas BW and Res BW settings. Actual center frequency of Meas BW and the limit line have ½ Meas BW offset when the Meas BW Edge is selected.

3GPP2 requires the “Carrier Center to Meas BW Edge” definition. LTE conformance test requires “Carrier Edge to Meas BW Center” and/or “Carrier Edge to Meas BW Edge” definition

- **CTOCenter** – From carrier center to the center of offset measuring filter*
- **CTOEdge** - From carrier center to the nominal –3 dB point of the offset measuring filter* closer to the carrier
- **ETOCenter** – From Center Frequency – Span of Ref Channel / 2 (for lower offset), Center Frequency + Span of Ref Channel / 2 (for upper offset) of the carrier closest to each offset to the center of offset measuring filter*
- **ETOEdge** - From Center Frequency – Span of Ref Channel / 2 (for lower offset), Center Frequency + Span of Ref Channel / 2 (for upper offset) of the carrier closest to each offset to the nominal –3 dB point of the offset measuring filter* closer to the carrier

*Measuring filter = Meas BW (N) x Res BW

10 Spectrum Emission Mask Measurement
Meas Setup



parameter_table_ 54.42177

| | |
|----------------------|--|
| 24.18745 | |
| Key Path | Meas Setup, Offset/Limits |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN |
| Remote Command | [:SENSe] :SEMAsk:OFFSet [1] 2 :TYPE CTOCenter CTOEdge ETOCenter ETOEdge [:SENSe] :SEMAsk:OFFSet [1] 2 :TYPE? |
| Example | SEM:OFFS:TYPE ETOC SEM:OFFS:TYPE? |
| Notes | OFFSet1 is for BTS, 2 for MS. Default is BTS. Note that Offset sub op code 2 is supported only in Non-SA modes. In the SA mode, Offset sub op code 1 is used for both BTS and MS. You must be in the mode that includes SEM measurements to use this command. Use :INSTrument:SElect to set the mode. |
| Preset | SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV: CTOC C2K: CTOE 1xEVDO: CTOE LTE: ETOC LTETDD: ETOC |
| State Saved | Saved in instrument state. |
| Range | Carrier Center To Meas BW Center Carrier Center To Meas BW Edge Carrier Edge To Meas BW Center Carrier Edge To Meas BW Edge |
| Initial S/W Revision | A.03.00 |
| Help Map ID | 9080 |

Method

Sets the measurement method:

- **Integ BW**—enables you to set the channel integration bandwidth.
- **RRC Weight**—selects Root Raised Cosine (RRC) filtering of the carriers. The α value (rolloff) for the filter is set to the value of the Filter Alpha parameter.

| | |
|------------------|--|
| parameter_table_ | 54.42177 |
| 24.18745 | |
| Key Path | Meas Setup |
| Mode | SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:FILTer [:RRC] [:STATe] OFF ON 0 1 [:SENSe] :SEMAsk:FILTer [:RRC] [:STATe] ? |

| | |
|---------------------------------|---|
| Example | SEM:FILT ON SEM:FILT? |
| Notes | For the C2K and 1xEVDO mode, this key is not available. 1 ON = RRC Weight, 0 OFF = IntegBW You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Dependencies | WLAN: RRC Weight is not supported when the radio standard is WLAN 802.11ac (80+80MHz). |
| Preset | SA, WIMAX OFDMA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, WLAN, MSR, LTEAFDD, LTEATDD: OFF WCDMA, TD-SCDMA, DTMB (CTTB), Digital Cable TV: ON |
| State Saved | Saved in instrument state. |
| Range | RRCWeight IntegBW |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9034 |

Filter Alpha

Sets the alpha value for the RRC Filter.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Mode | SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:FILTer[:RRC]:ALPHa <real> [:SENSe] :SEMAsk:FILTer[:RRC]:ALPHa? |
| Example | SEM:FILT:ALPH 0.3 SEM:FILT:ALPH? |
| Notes | For the C2K and 1xEVDO mode, this key is not available. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | 0.22 DTMB (CTTB): 0.05 Digital Cable TV: 0.15 |
| State Saved | Saved in instrument state. |
| Min | 0.01 |
| Max | 1.0 |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9035 |

Meas Preset

Restores all the measurement parameters to their default values.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Meas Setup |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CONFigure:SEMask |
| Example | CONF:SEM |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | Selecting Meas Preset will restore all measurement parameters to their default values. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9036 |

10 Spectrum Emission Mask Measurement
Mode

Mode

See "[Mode](#)" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1072 for more information.

| | |
|-------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPle ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODes | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPUt | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGN | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

There is no 'Peak Search' supported in Spectrum Emission Mask so this front-panel key displays a blank menu when pressed.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9072 |

10 Spectrum Emission Mask Measurement
Print

Print

See "[Print](#) " on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 1081.

| Key Path | Recall |
|----------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

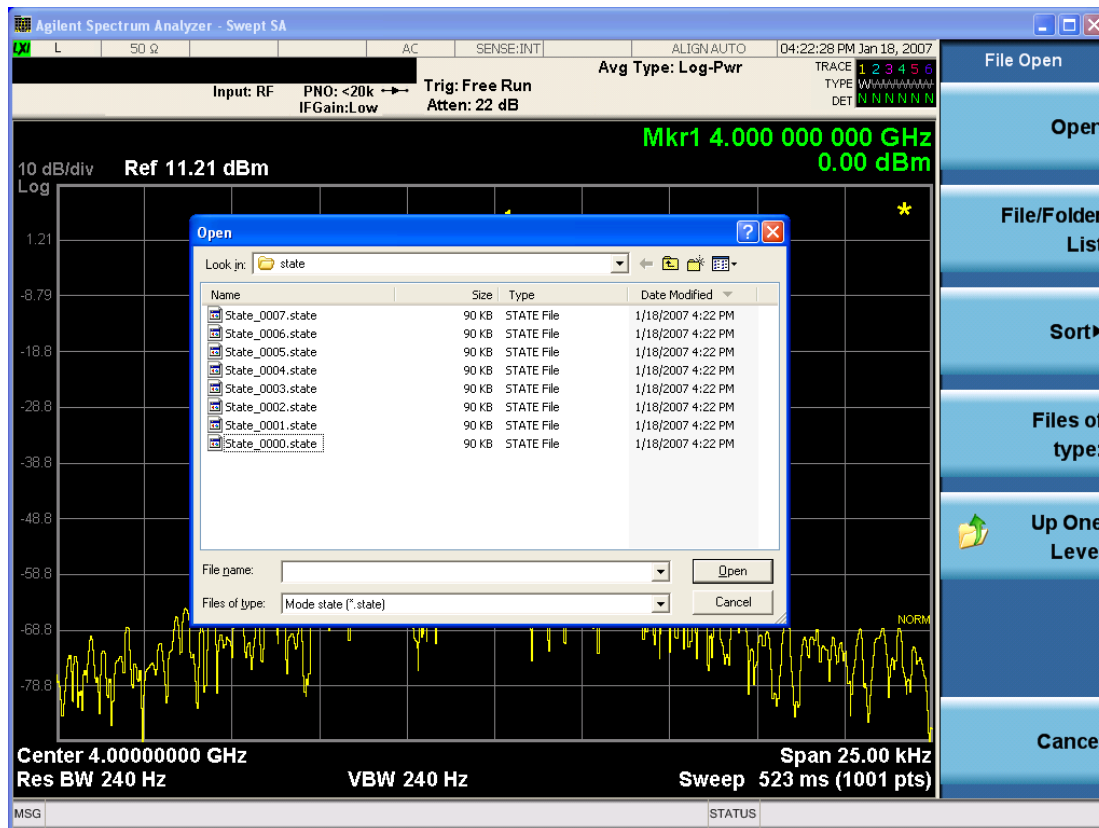
The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

10 Spectrum Emission Mask Measurement Recall



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|---|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEQuences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|-----------------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|-----------------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMory:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1089

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|----------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

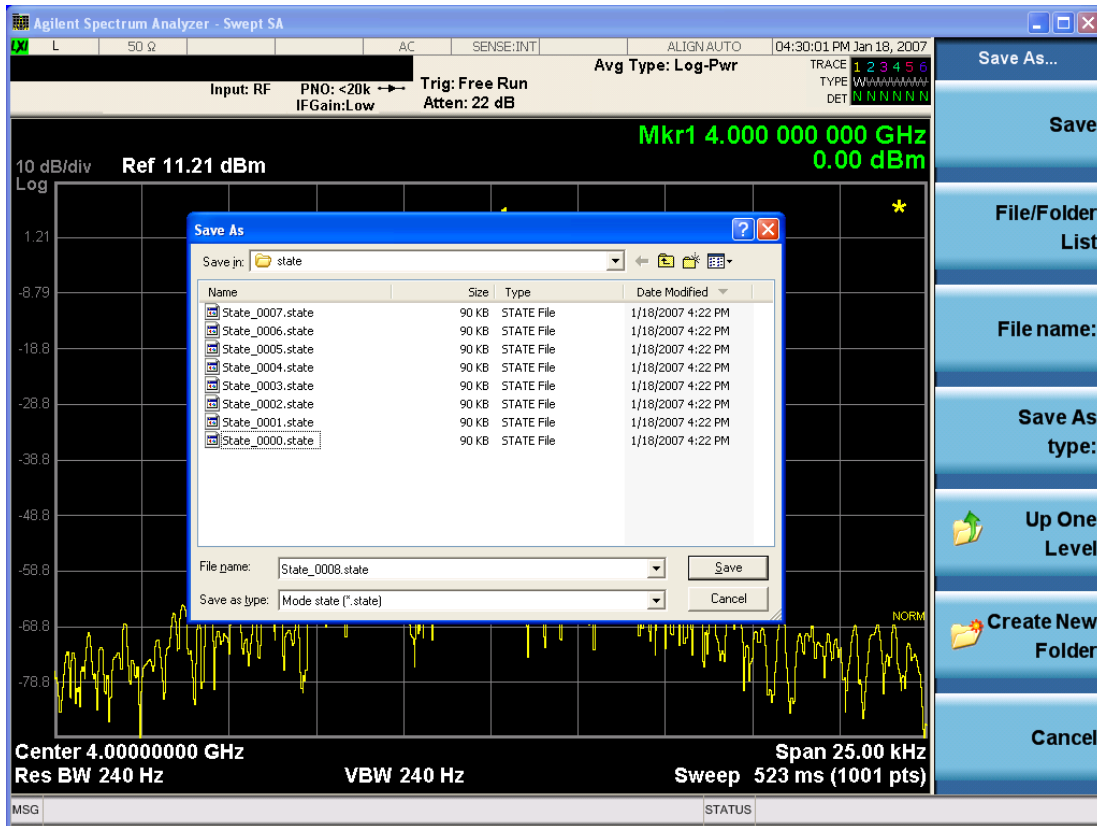
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

| | |
|-------------------------------------|---|
| | update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away. |
| Backwards Compatibility SCPI | :MMEMory:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1094](#)

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|---------------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|----------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Mass Storage Remove Directory (Remote Command Only)

| | |
|----------|------------------|
| Key path | SCPI Only |
|----------|------------------|

| | |
|-----------------------|--------------------------------------|
| Remote Command | :MMEMory:RDIRectory <directory_name> |
|-----------------------|--------------------------------------|

| | |
|-------|--|
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
|-------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|----------|------------------------|
| Key Path | Save, Sequences |
|----------|------------------------|

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|-----------------------|---|
| Remote Command | :MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt" |
|-----------------------|---|

| | |
|----------------|---------------------------------------|
| Example | :MMEM:STOR:SEQ:SLISt "MySequence.txt" |
|----------------|---------------------------------------|

| | |
|-------|--|
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none"> -CSV (Comma delimited) (*.csv) -Text (Tab delimited) (*.txt) |
|-------|--|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|-----------------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|-----------------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

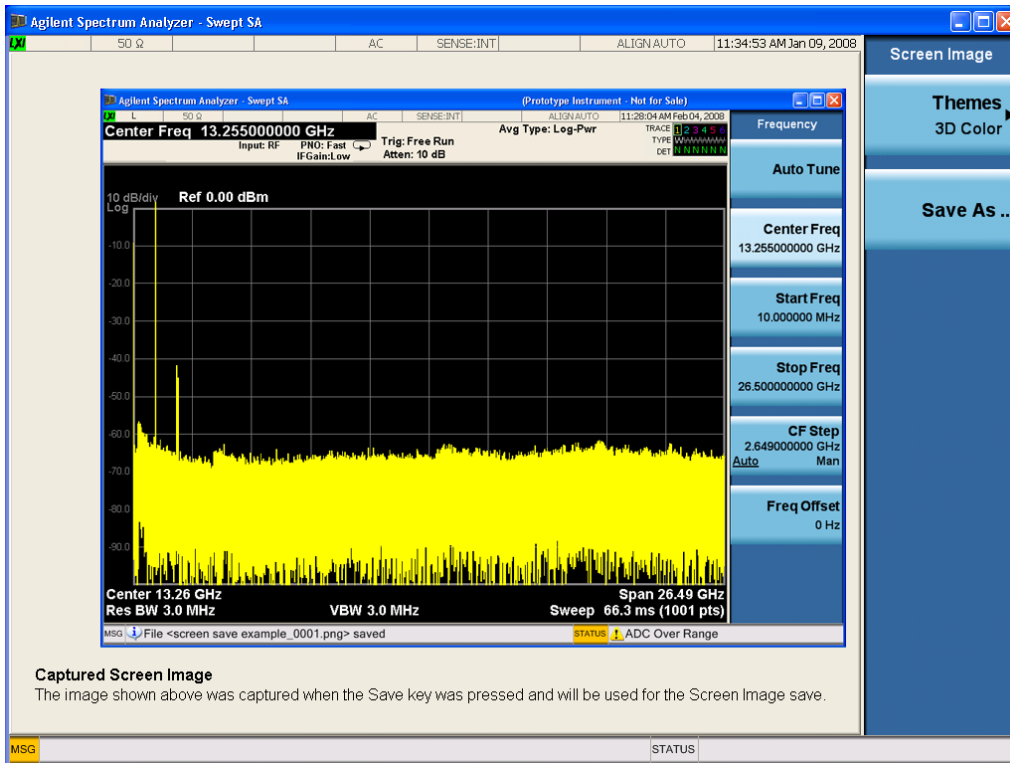
| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReen <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReem:THEMe TDColor TDMonochrome FCOLor FMONochrome :MMEMory:STORe:SCReem:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 1106

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------|---|
| Remote Command | :OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|----------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1109](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1109 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1109 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| Key Path | Source, Amplitude |
|----------------------|---|
| Dependencies | This key is unavailable, and is grayed out when the " List Sequencer " on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFerence <ampl> :SOURce:POWer:REFerence? :SOURce:POWer:REFerence:STATe OFF ON 0 1 :SOURce:POWer:REFerence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on " List Sequencer " on page 2585. If the " Sequencer " on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " Sequencer " on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 1113](#),

"W-CDMA Channel Number Ranges" on page 1114, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1115, and "LTE FDD Channel Number Ranges" on page 1117.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|--|--|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ $350 \leq n \leq 425$ | $n \div 5 + 1850.1$ $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ $1662 \leq n \leq 1862$ | $n \div 5 + 1450$ $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ $4132 \leq n \leq 4233$ | $n \div 5 + 670.1$ $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ $4162 \leq n \leq 4188$ | $n \div 5 + 670.1$ $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| Band IX | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| Band X | Downlink | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | Uplink | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| | | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| Band XI | Downlink | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Uplink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| Band XII | Downlink | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| | | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | Uplink | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIII | Downlink | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| | | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | Uplink | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIV | Downlink | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| | | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | Uplink | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| Band XIX | Downlink | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| | | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | Uplink | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 \times N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|---------------------------|--------------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| 400 Euro PAMR | Downlink (BS, forward link) | | |
| | Downlink (BS, forward link) | | |
| | Downlink (BS, forward link) | | |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | 2110 | | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | 1930 | | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | 1805 | | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | 2110 | | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | 869 | | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | 875 | | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | 2620 | | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | 925 | | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | 1844.9 | | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | 2110 | | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | 1475.9 | | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | 729 | | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | 746 | | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | 758 | | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | 734 | | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | 860 | | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 - 6149 | 830 | 24000 | 24000 - 24149 |
| 20 | 791 | 6150 | 6150 - 6449 | 832 | 24150 | 24150 - 24449 |
| 21 | 1495.9 | 6450 | 6450 - 6599 | 1447.9 | 24450 | 24450 - 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 - 8039 | 1626.5 | 25700 | 25700 - 26039 |
| 25 | 1930 | 8040 | 8040 - 8689 | 1850 | 26040 | 26040 - 26689 |
| 26 | 859 | 8690 | 8690 - 9039 | 814 | 26690 | 26690 - 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 - 36199 | 1900 | 36000 | 36000 - 36199 |
| 34 | 2010 | 36200 | 36200 - 36349 | 2010 | 36200 | 36200 - 36349 |
| 35 | 1850 | 36350 | 36350 - 36949 | 1850 | 36350 | 36350 - 36949 |
| 36 | 1930 | 36950 | 36950 - 37549 | 1930 | 36950 | 36950 - 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|------------------|
| 37 | 1910 | 37550 | 37550 -37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 -38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 -38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 -39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

Table: UTRA Absolute Radio Frequency Channel Number 1.28 Mcps TDD Option

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900–1920 MHz | 9504 to 9596 |
| | 2010–2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850–1910 MHz | 9254 to 9546 |
| | 1930–1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910–1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570–2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300–2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880–1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF
 :SOURce:FREQuency:CHANnels:BAND?

| | |
|-----------------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} - \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFeRence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFeRence <freq> :SOURce:FREQuency:REFeRence? :SOURce:FREQuency:REFeRence:STATe OFF ON 0 1 :SOURce:FREQuency:REFeRence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samps, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load afile to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:LOAD:ALL <string>

Example :SOUR:RAD:ARB:LOAD:ALL "D: varb"

Notes <string> - specifies the directory on the HDD to load the files into ARB memory from.
 When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURCE:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "Query ARB Memory Full File List (Remote Command Only)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURCE:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURCE:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|--|
| | <p><integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"</p> |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:CBWidth <freq> :SOURCE:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:BANDwidth <freq> :SOURCE:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NChannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

"Sequencer" on page 2585 and **"Sequencer" on page 2586** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 2611**.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 2611**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 2612**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as **"Change Directory..." on page 2613**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as **"Default Directory..." on page 2613**

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540](#).

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command :SOURce:RADio:ARB:SEQuence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 1171](#) "For Setup SCPI".)

:SOURce:RADio:ARB:SEQuence[:MWAVeform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 1172](#) below.)

Example

For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes

For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. “Left” module for E6630A or “TRX1” module for E6640A.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LICense[:FPACK]:WAVeform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load afile to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LiCense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LiCense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory"](#) on page 2612.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..."](#) on page 2613.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..."](#) on page 2613

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LIcense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path **Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses**

Remote Command :SYSTem:LKEY:WAVeform:LOCK <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>

Example SYST:LKEY:WAV:LOCK 1
or
SYST:LIC:WAV:LOCK 1

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command :SYSTem:LKEY:WAVeform:STATus? <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>

Example :SYST:LKEY:WAV:STAT? 1
<"Locked"
or
:SYST:LIC:WAV:STAT? 1
<"Locked"

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266" |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMorY:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEViation] :SOURce:PM[:DEViation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRFrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select "On", trigger event will occur on both Internal and External2 paths. Select "Off" will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMEDIATE INTERNAL KEY BUS EXTERNAL2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|---|---|
| R e m o t e C o m m a n d | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND? |
| E x a m p l | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND? |

| | |
|---|--|
| e | |
| N | The command is to setup below parameter array of whole list sequence. |
| 0 | Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591 . |
| t | If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then |
| e | generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| s | |
| R | NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI |
| e | V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO |
| m | REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 |
| o | BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1 |
| t | 9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN |
| e | D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF |
| C | |
| o | |
| m | |
| m | |
| a | |
| n | |
| d | |
| N | |
| o | |
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| e | |
| s | |
| D | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on |
| e | page 2587 . |
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|---|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> – plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTinuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

| | |
|----------------------|--|
| | see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount? |
| Example | :SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC? |
| Notes | The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 2616 and "Play Count" on page 2617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 2616 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #" |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ? |
| Example | :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 2618 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in |

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 9055 |

Ref Value

Sets the X reference value.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq> :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel? |
| Example | DISP:SEM:VIEW:WIND:TRAC:X:RLEV 10 DISP:SEM:VIEW:WIND:TRAC:X:RLEV? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Couplings | If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. |
| Preset | 1.0 GHz |
| State Saved | Saved in instrument state. |
| Min | -1000 GHz |
| Max | 1000 GHz |
| Default Unit | Hz |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 9085 |

Scale/Div

Sets the horizontal scale.

| | |
|--------------------------|-----------------|
| parameter_table_24.18745 | 54.42177 |
|--------------------------|-----------------|

| | |
|-----------------------------|--|
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq> :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision ? |
| Example | DISP:SEM:VIEW:WIND:TRAC:X:PDIV 500 DISP:SEM:VIEW:WIND:TRAC:X:PDIV? |
| Notes | You must be in a mode that includes the SEM measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. |
| Preset | Automatically Calculated |
| State Saved | Yes Saved in instrument state. |
| Min | 1 Hz |
| Max | 10.0 GHz |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 9086 |

Ref Position

Sets the reference position for the X axis to Left, Center or Right.

| | |
|-----------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOsition LEFT CENTer RIGHT :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOsition? |
| Example | DISP:SEM:VIEW:WIND:TRAC:X:RPOS LEFT DISP:SEM:VIEW:WIND:TRAC:X:RPOS? |
| Notes | You must be in a mode that includes the SEM measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | CENTer |
| State Saved | Yes Saved in instrument state. |
| Range | Left Ctr Right |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 9087 |

Auto Scaling

Toggles the scale coupling function between On and Off.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18745 | 54.42177 |
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCTV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 1 OFF ON :DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle? |
| Example | DISP:SEM:VIEW:WIND:TRAC:X:COUP ON DISP:SEM:VIEW:WIND:TRAC:X:COUP? |
| Notes | You must be in a mode that includes the SEM measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | 1 |
| State Saved | Yes Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 9088 |

Sweep/Control

Displays a menu that enables you to set up and control the time, gate method, and source of the current measurement. See [Sweep/Control@3273](#) for more information.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9068 |

Pause

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused. See [Pause/Resume@3290@i](#) for more details.

| | |
|--------------------------|----------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Sweep/Control |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9069 |

Gate

Accesses a menu that enables you to control the gating function. The Gate functionality is used to view signals best viewed by qualifying them with other events.

Gate setup parameters are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset.

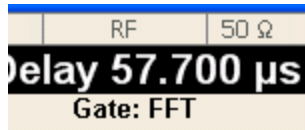
| | |
|----------------------|---|
| Key Path | Sweep/Control |
| Scope | Meas Global |
| Readback | The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT. |
| Initial S/W Revision | Prior to A.02.00 |

Gate On/Off

Turns the gate function on and off.

When the Gate Function is on, the selected Gate Method is used along with the gate settings and the signal at the gate source to control the sweep system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the measurement bar reflects that it is on and what method is used, as seen in the following "Gate: FFT" annunciator graphic.



| | |
|-------------------------------------|--|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe [:STATe] OFF ON 0 1 [:SENSe] :SWEep:EGATe [:STATe] ? |
| Example | SWE:EGAT ON SWE:EGAT? |
| Dependencies | <p>When in the ACP measurement:</p> <ul style="list-style-type: none"> • When Meas Method is RBW or FAST, this function is unavailable and the key is grayed out. • Whenever Gate is on, Meas Method, RBW or FAST is unavailable and keys for those are grayed out. • When Gate is on, Offset Res BW and Offset Video BW are ignored (if you set these values) and the measurement works as if all Offset Res BW and all Offset Video BW are coupled with the Res BW and the Video BW under the BW menu. When Gate is on, the Offset BW key in the Offset/Limit menu is grayed out. |
| Preset | Off LTETDD: On |
| State Saved | Saved in instrument state |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :SWEep:TIME:GATE [:STATe] ESA compatibility |
| Backwards Compatibility Notes | In ESA, Trig Delay (On) and Gate (On) could not be active at the same time.. This dependency does not exist in PSA or in the X-Series. |
| Initial S/W Revision | Prior to A.02.00 |

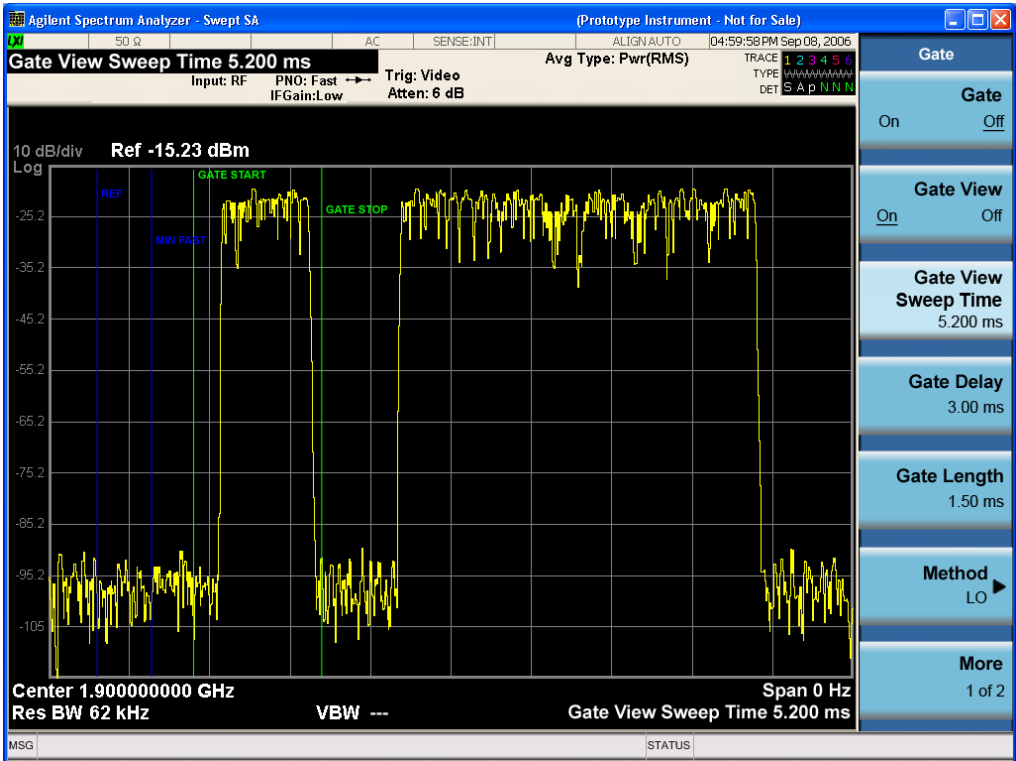
Gate View On/Off

Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

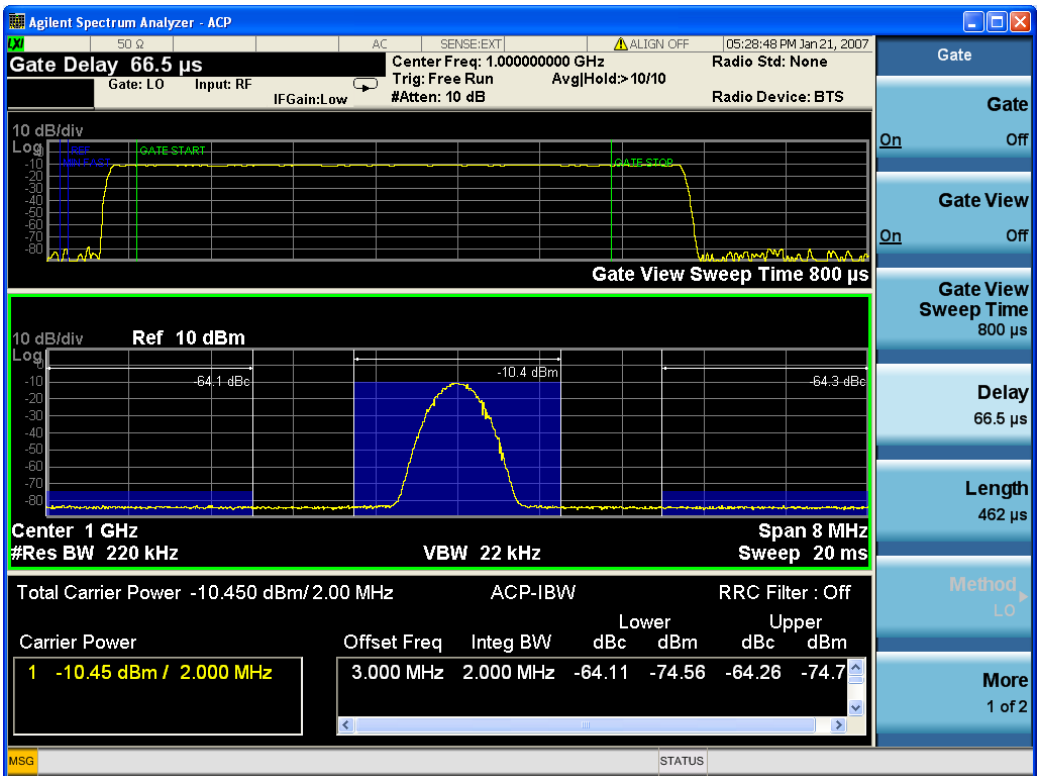
Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window, showing the positions of the Gate, is shown between the Measurement Bar and the reduced measurement window. By reducing the height of the measurement window, some of the annotation on the Data Display may not fit and is not shown.

| | |
|-----------------------------|---|
| Key Path | Sweep/Control, Gate |
| Remote Command | [:SENSe] :SWEep:EGATe:VIEW ON OFF 1 0 [:SENSe] :SWEep:EGATe:VIEW? |
| Example | SWE:EGAT:VIEW ON turns on the gate view. |
| Dependencies | In the Swept SA measurement: In Gate View, the regular Acq Time key is grayed out . When pressed, the grayed out key puts up the informational message "Use Gate View Sweep Time in the Gate menu." In the other measurements: When you turn Gate View on, the lower window takes on the current state of the instrument. Upon leaving Gate View, the instrument takes on the state of the lower window. When you turn Gate View on, the upper window Acquisition Time is set to the gate view acquisition time. |
| Couplings | These couplings apply to the Swept SA measurement: <ul style="list-style-type: none"> • When Gate View is turned on, the instrument is set to Zero Span. • Gate View automatically turns off whenever a Span other than Zero is selected. • Gate View automatically turns off if you press the Last Span key while in Gate View, and the instrument returns to the Span it was in before entering Gate View (even if that is Zero Span). • When Gate View is turned on, the sweep time used is the gate view sweep time. This is set according to the rules in section "Gate View Setup " on page 1246 • When Gate View is turned off, Sweep Time is set to the normal Swept SA measurement sweep time. • If Gate View is on and Gate is off, then turning on Gate turns off Gate View. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |

A sample of the Gate View screen in the Swept SA measurement is shown in the following graphic :



A sample of the Gate View screen in other measurements is shown in the following graphic . This example is for the ACP measurement:



Turning Gate View off returns the analyzer to the Normal measurement view.

In the Swept SA, the normal measurement view is the single-window Swept SA view. When returning to this view, the Swept SA measurement returns to the Span it was in before entering **Gate View** (even if that is Zero Span).

The **Gate View** window is triggered from the Gate Source, with zero trigger delay. Also, when updating the **Gate View** window, the Gate itself must not operate. So it is internally shut off while the gate view window is being updated. For the Swept SA measurement, this means that the Gate is internally shut off whenever the gate view window is displayed. The measurement bar and softkeys continue to show the Trigger source for the main sweep window and give no indication that the Gate is shut off or that the Gate View window is triggered from the Gate Source.

When in **Gate View**, vertical lines are displayed in the Gate View window as follows:

- Green lines are displayed at the gate edges as follows: in Edge Gate, a line is shown for Delay and one for the end of the Gate period, defined by Length. You can adjust the position of the green lines by adjusting the gate length and the gate delay. These lines update in the Gate View window as the active function changes, even if the window is not being updated. In Gated FFT, their location is relative to the left edge of the screen.
- A blue line is displayed showing the delay reference, that is, the reference point for the Gate Delay within the Zero Span window. The blue line represents where (in time) the effective location of the gate start would be if the gate were programmed to zero delay.
-

Gate View Setup

Accesses a menu that enables you to setup parameters relevant to the Gate View

| | |
|----------------------|----------------------------|
| Key Path | Sweep/Control, Gate |
| Scope | Meas Global |
| Initial S/W Revision | A.10.00 |

Gate View Acquisition Time

Controls the acquisition time in the Gate View window. To provide an optimal view of the gate signal, the analyzer initializes Gate View Acq Time based on the current settings of Gate Delay and Gate Length.

| | |
|-----------------------|---|
| Key Path | Sweep/Control, Gate, Gate View Setup |
| Remote Command | [:SENSe] :SWEep:EGATe:TIME <time> [:SENSe] :SWEep:EGATe:TIME? |
| Example | SWE:EGAT:TIME 500 ms |
| Dependencies | Gate View Acquisition Time is initialized: <ul style="list-style-type: none"> • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. <ol style="list-style-type: none"> 1. Compute the location of the "gate stop" line, which you know is at time $t = t_{min} + GateDelay +$ |

| GateLength. | |
|----------------------|--|
| Preset | 519.3 μ s WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 6000 s |
| Initial S/W Revision | Prior to A.02.00 |

Gate View Start Time

Controls the time at the left edge of the Gate View.

| Key Path | Sweep/Control, Gate, Gate View Setup |
|-----------------------|---|
| Remote Command | [:SENSe] :SWEep:EGATe:VIEW:STARt <time> [:SENSe] :SWEep:EGATe:VIEW:STARt? |
| Example | SWE:EGAT:VIEW:STAR 10ms |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. See error -131. |
| Preset | 0 ms |
| State Saved | Saved in instrument state |
| Min | 0 |
| Max | 500 ms |
| Initial S/W Revision | A.10.00 |

Gate Delay

Controls the length of time from the time the gate condition goes True until the gate is turned on.

| Key Path | Sweep/Control, Gate |
|-----------------------|--|
| Remote Command | [:SENSe] :SWEep:EGATe:DELay <time> [:SENSe] :SWEep:EGATe:DELay? |
| Example | SWE:EGAT:DELay 500ms SWE:EGAT:DELay? |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 57.7 μ s WiMAX OFDMA: 71 μ s GSM/EDGE: 600 μ s |

| | |
|-------------------------------------|--|
| | WLAN: 500 us WLAN: 36 us |
| State Saved | Saved in instrument state |
| Min | 0.0 us |
| Max | 100 s |
| Backwards Compatibility SCPI | [:SENSe]:SWEep:TIME:GATE:DELay ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Length

Controls the length of time that the gate is on after it opens.

| Key Path | Sweep/Control, Gate |
|-------------------------------------|--|
| Remote Command | [:SENSe]:SWEep:EGATe:LENGth <time> [:SENSe]:SWEep:EGATe:LENGth? |
| Example | SWE:EGAT:LENG 1 SWE:EGAT:LENG? |
| Notes | Units of time are required or no units; otherwise an invalid suffix error message will be generated. |
| Preset | 461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us WLAN: 1.54 ms WLAN: 32 us |
| State Saved | Saved in instrument state |
| Min | 100 ns |
| Max | 5 s |
| Backwards Compatibility SCPI | [:SENSe]:SWEep:TIME:GATE:LENGth ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Source

The menus under the **Gate Source** key are the same as those under the **Trigger key**, with the exception that neither **Free Run** nor **Video** are available as Gate Source selections. However, a different SCPI command is used to select the Gate Source (see table below) because you may independently set the Gate Source and the Trigger Source.

Any changes to the settings in the setup menus under each Gate Source selection key (for example: Trigger Level, Trigger Delay, etc.) also affect the corresponding settings under the Trigger menu keys. The SCPI commands used for these are the same for Trigger and Gate, since there is only one setting which affects both Gate and Trigger. Example: to set the Trigger Level for External 1 you use the command :TRIG:EXT1:LEV regardless of whether you are using External 1 as a Trigger Source or a Gate Source.

| Key Path | Sweep/Control, Gate |
|---------------------------------|--|
| Remote Command | [:SENSe] :SWEep:EGATe:SOURce EXTernal1 EXTernal2 LINE FRAME RFBurst [:SENSe] :SWEep:EGATe:SOURce? |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" error. |
| Preset | EXTernal 1 GSM/EDGE, MSR: FRAME LTETDD: EXTernal 1When Direction is Downlink, FRAME when Direction is Uplink. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE

When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

| Key Path | Trigger |
|-------------------------------------|--|
| Example | TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA |
| Notes | Log Plot and Spot Frequency measurements do not support Video Trigger |
| Dependencies | Video trigger is allowed in average detector mode. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |

| | |
|-------------------------------|---|
| Backwards Compatibility Notes | In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

| | |
|-------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:LEVel <ampl> :TRIGger[:SEquence]:VIDeo:LEVel? |
| Example | TRIG:VID:LEV -40 dBm |
| Notes | When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level. Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level. |
| Couplings | This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu. |
| Preset | Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. |
| State Saved | Saved in instrument state |
| Min | -170 dBm |
| Max | +30 dBm |
| Default Unit | Depends on the current selected Y axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:LEVel :TRIGger[:SEquence]:IF:LEVel? |
| Backwards Compatibility Notes | This alias is provided for backward compatibility with VSA/PSA comms apps. |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|---|
| Key Path | Trigger, Video |
| Remote Command | :TRIGger[:SEquence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEquence]:VIDeo:SLOPe? |
| Example | TRIG:VID:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:IF:SLOPe NEGative POSitive :TRIGger[:SEquence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-------------------------------|---|
| Remote Command | :TRIGger[:SEquence]:SLOPe POSitive NEGative :TRIGger[:SEquence]:SLOPe? |
| Example | TRIG:SLOP NEG |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source. |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|----------------|---|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |

| | |
|------------------------------|--|
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:LEVel <level> :TRIGger[:SEquence]:EXTernal:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|----------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the |

| | |
|-------------------------------------|--|
| | period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|-----------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:DELAy:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal1:DELAy:COMPensation? |
| Example | TRIG:EXT1:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| | |
|-----------------|-------------------------------------|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT2 Swept SA measurement |

| | |
|------------------------------|--|
| | TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

| | |
|----------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation? |
| Example | TRIG:EXT2:DEL:COMP ON |
| Dependencies | No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP. |
| Preset | OFF |
| State Saved | Saved in instrument state |
| Initial S/W Revision | A.11.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| Key Path | Trigger |
|-------------------------------|--|
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| Key Path | Trigger, RF Burst |
|-----------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the |

| | |
|-------------------------------------|--|
| | RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|--------------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:
3. absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level
4. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

| Key Path | Trigger, RF Burst |
|-------------------------------------|---|
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEquence]:RFBurst:LEVel:RELative? |
| Example | TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB |
| Notes | Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent. |
| Dependencies | This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering. |
| Preset | -6 dB GSM: -25 dB |
| State Saved | Saved in instrument state |
| Min | -45 dB |
| Max | 0 dB |
| Default Unit | dB or dBc |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:RFBurst:LEVel This legacy command is aliased to :TRIGger[:SEquence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| Key Path | Trigger, RF Burst |
|-------------------------------------|--|
| Remote Command | :TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:SLOPe |

| | |
|-------------------------------|--|
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

| Key Path | Trigger |
|------------------------------|--|
| Example | TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Readback | [Sync: <value of Sync Source>], for example, [Sync: External 1] |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

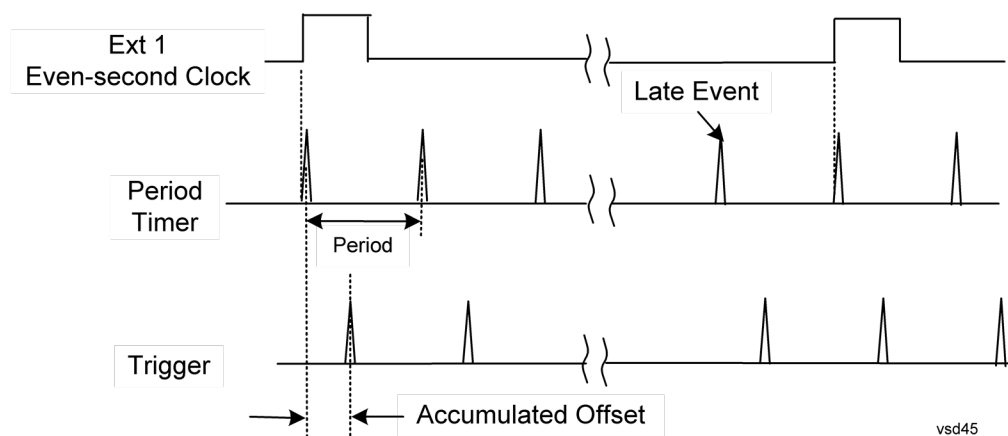
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not miss-trigger. Miss-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

| | |
|----------------|---|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:PERiod <time> :TRIGger[:SEquence]:FRAMe:PERiod? |
| Example | TRIG:FRAM:PER 100 ms |
| Dependencies | The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes. |
| Couplings | The same period is used in the Gate Source selection of the period timer. |
| Preset | 20 ms |

| | |
|----------------------|---------------------------|
| | GSM: 4.615383 |
| State Saved | Saved in instrument state |
| Min | 100.000 ns |
| Max | 559.0000 ms |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

| | |
|-----------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet <time> :TRIGger[:SEquence]:FRAMe:OFFSet? |
| Example | TRIG:FRAM:OFFS 1.2 ms |
| Notes | <p>The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key).</p> <p>Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365.</p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.</p> |
| Notes | <p>When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value.</p> <p>The SCPI query simply returns the value currently showing on the key.</p> |

| | |
|----------------------|---|
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

| | |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:FRAMe:ADJust <time> |
| Example | TRIG:FRAM:ADJ 1.2 ms |
| Notes | Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section "Trig Delay" on page 365 An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event. |
| Notes | The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query. |
| Dependencies | The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. |
| Couplings | The same offset is used in the Gate Source selection of the period timer. |
| Preset | 0 s |
| State Saved | Saved in instrument state |
| Min | -10.000 s |
| Max | 10.000 s |
| Default Unit | S |
| Initial S/W Revision | Prior to A.02.00 |

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

| | |
|-----------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet |
| Example | TRIG:FRAM:OFFS:DISP:RES |
| Initial S/W Revision | Prior to A.02.00 |

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

| | |
|-------------------------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal1 EXTernal2 RFBurst OFF :TRIGger[:SEquence]:FRAMe:SYNC? |
| Example | TRIG:FRAM:SYNC EXT2 |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. |
| Preset | Off GSM/EDGE, MSR,LTE,LTETDD: RFBurst |
| State Saved | Saved in instrument state |
| Readback | The current setting is read back to this key and it is also Readback to the previous Periodic Timer trigger key. |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:SYNC EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

| | |
|----------------------|---|
| Key Path | Trigger, Periodic Timer, Sync Source |
| Example | TRIG:FRAM:SYNC OFF |
| Readback | Off |
| Initial S/W Revision | Prior to A.02.00 |

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

| | |
|------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA |
| Dependencies | Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

| | |
|-----------------------|---|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel? |
| Example | TRIG:EXT1:LEV 0.4 V |
| Couplings | This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu. |

| | |
|-------------------------------------|---|
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:LEVel |
| Backwards Compatibility SCPI | For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|--------------------------------------|--|
| Key Path | Trigger, External 1 |
| Remote Command | :TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal1:SLOPe? |
| Example | TRIG:EXT1:SLOP NEG |
| Couplings | This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:EXTernal:SLOPe |
| Backwards Compatibility SCPI | For backward compatibility, the parameter EXTernal is mapped to EXTernal1 |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

| | |
|-------------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR EXT2 Swept SA measurement TRIG:< meas>:SOUR EXT2 Measurements other than Swept SA |
| Dependencies | In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2. |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

| | |
|-------------------------------------|---|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel? |
| Example | TRIG:EXT2:LEV 1.1 V |
| Couplings | This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu. |
| Preset | 1.2 V |
| State Saved | Saved in instrument state |
| Min | -5 V |
| Max | 5 V |
| Default Unit | V |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel |
| Initial S/W Revision | Prior to A.02.00 |

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------|--|
| Key Path | Trigger, External 2 |
| Remote Command | :TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe? |
| Example | TRIG:EXT2:SLOP NEG |
| Couplings | This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

| | |
|-------------------------------|--|
| Key Path | Trigger |
| Example | TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA |
| State Saved | Saved in instrument state |
| Status Bits/OPC dependencies | The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears. |
| Backwards Compatibility Notes | The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

| | |
|-------------------------------------|---|
| Key Path | Trigger, RF Burst |
| Scope | Meas Global |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute? |
| Example | TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm |
| Notes | Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below. Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions. If mode is Bluetooth, the default value is -50 dBm. |
| Couplings | This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu |
| Preset | -20 dBm |
| State Saved | Saved in instrument state |
| Min | -200 dBm |
| Max | 100 dBm |
| Default Unit | depends on the current selected Y-Axis unit |
| Backwards Compatibility SCPI | :TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

| | |
|-----------------------|---|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE? |
| Example | TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative. |
| Preset | ABSolute |

| | |
|--------------------------|---------------------------|
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.04.00 |

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

| | |
|-------------------------------------|--|
| Key Path | Trigger, RF Burst |
| Remote Command | :TRIGger[:SEQuence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEQuence]:RFBurst:SLOPe? |
| Example | TRIG:RFB:SLOP NEG |
| Couplings | This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu). |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | :TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe |
| Backwards Compatibility Notes | The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers. |
| Initial S/W Revision | Prior to A.02.00 |

Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

| | |
|-----------------------|--|
| Key Path | Trigger, Periodic Timer |
| Remote Command | :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff <time> :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff? :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe? |
| Preset | On, 1.000 ms |
| State Saved | Saved in instrument state |
| Min | 0 ms |
| Max | +500 ms |

| | |
|----------------------|------------------|
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

| Key Path | Trigger |
|----------------------|---|
| Readback line | <p>Displays a summary of the Auto Trig and Holdoff settings, in square brackets</p> <p>First line: Auto Off or Auto On</p> <p>Second Line: "Hldf" followed by:</p> <ul style="list-style-type: none"> • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal |
| Initial S/W Revision | A.02.00 |

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|---|
| Remote Command | <pre>:TRIGger[:SEquence]:ATRigger <time> :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe?</pre> |
| Example | <pre>TRIG:ATR:STAT ON TRIG:ATR 100 ms</pre> |
| Notes | The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 1 ms |
| Max | 100 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

| Key Path | Trigger, Auto/Holdoff |
|-----------------------|--|
| Remote Command | :TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATE OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATE? |
| Example | TRIG:HOLD:STAT ON TRIG:HOLD 100 ms |
| Dependencies | Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated. |
| Preset | Off, 100 ms |
| State Saved | Saved in instrument state |
| Min | 0 s |
| Max | 0.5 s |
| Default Unit | s |
| Initial S/W Revision | Prior to A.02.00 |

Gate Preset (Remote Command Only)

Presets the time-gated spectrum analysis capability.

This command sets gate parameter values to the ESA preset values, as follows:

Gate trigger type = edge

Gate polarity = positive

Gate delay = 1 us

Gate length = 1 us

| | |
|-----------------------|---|
| Remote Command | [:SENSe]:SWEep:TIME:GATE:PRESet ESA Compatibility |
| Initial S/W Revision | Prior to A.02.00 |

Gate Level (Remote Command Only)

Sets the gate input transition point level for the external TRIGGER inputs on the front and rear panel. This is a legacy command for PSA compatibility. It is simply an alias to the equivalent trigger level command.

| | |
|-----------------------------|--|
| Remote Command | <code>[:SENSe] :SWEep:EGATe:EXTeRnal [1] 2 :LEVel <voltage></code> <code>[:SENSe] :SWEep:EGATe:EXTeRnal [1] 2 :LEVel ?</code> |
| Notes | This command is simply an alias to <code>:TRIGger[:SEQuence]:EXTeRnal[1] 2:LEVel</code> For details refer |
| Initial S/W Revision | Prior to A.02.00 |

Gate Polarity (Remote Command Only)

Sets the polarity for the gate signal. This setup is now done using the gate trigger's slope setting.

When Positive (Pos) is selected, a positive-going edge (Edge) or a high voltage (Level) will satisfy the gate condition, after the delay set with the Gate Delay key. When Negative (Neg) is selected, a negative-going edge (Edge) or a low voltage (Level) will satisfy the gate condition after the delay.

| | |
|-------------------------------------|--|
| Remote Command | <code>[:SENSe] :SWEep:EGATe:POLarity NEGative POSitive</code> <code>[:SENSe] :SWEep:EGATe:POLarity ?</code> |
| Example | <code>SWE:EGAT:POL NEG</code> <code>SWE:EGAT:POL ?</code> |
| Preset | POSitive |
| State Saved | Saved in instrument state |
| Backwards Compatibility SCPI | <code>[:SENSe] :SWEep:TIME:GATE:POLarity</code> ESA compatibility |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------------|--|
| Remote Command | <code>[:SENSe] :SWEep:TIME:GATE:LEVel HIGH LOW</code> <code>[:SENSe] :SWEep:TIME:GATE:LEVel ?</code> ESA compatibility |
| Preset | HIGH |
| Initial S/W Revision | Prior to A.02.00 |

System

See "System" on page 278

Trace/Detector

Accesses a menu of functions that enable you to control trace and detector for the current measurement.

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9060 |

Trace Type

Allows you to select the type of trace for the current measurement. The menu contains a 1-of-N selection of the trace type (Clear Write, Average, Max Hold, Min Hold).

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :TRACe:SEMask:TYPE WRITe AVERAge MAXHold MINHold :TRACe:SEMask:TYPE? |
| Example | TRAC:SEM:TYPE MINH TRAC:SEM:TYPE? |
| Notes | WRITe = Clear Write AVERAge = Average MAXHold = Maximum Hold MINHold = Minimum Hold |
| Couplings | When Detector setting is "Auto" ([:SENSe]:SEMask:DETEctor:AUTO?), Detector ([:SENSe]:SEMask:DETEctor[:FUNCTION]?) switches aligning with the switch of this parameter: "NORMal" with WRITe (Clear Write), "AVERAge" with AVERAge, "POSitive (peak)" with MAXHold, and "NEGative (peak)" with MINHold. |
| Preset | AVERAge |
| State Saved | Saved in instrument state. |
| Range | WRITe AVERAge MAXHold MINHold |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9039 |

Chan Detector

Accesses a menu of functions that enable you to control the detectors for reference channel. The following choices are available:

- Auto—the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.
- Normal—the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average—the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak—the detector determines the maximum of the signal within the sweep points.
- Sample—the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak—the detector determines the minimum of the signal within the sweep points.

| | |
|--------------------------|-----------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9042 |

Chan Detector Auto

Sets the detector to the default detection mode for the reference channel. This mode is dependent upon the current reference channel conditions.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:DETEctor:CARRier:AUTO ON OFF 1 0 [:SENSe] :SEMAsk:DETEctor:CARRier:AUTO? |
| Example | SEM:DET:CARR:AUTO OFF SEM:DET:CARR:AUTO? |
| Notes | See Couplings in the Trace Type section. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | ON |
| State Saved | Saved in instrument state |
| Range | On Off |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9076 |

Chan Detector Selection

Selects the detector mode for the reference channel.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:DETEctor:CARRier[:FUNction] AVERAge NEGative NORMAl POSitive SAMPlE [:SENSe] :SEMAsk:DETEctor:CARRier[:FUNction] ? |
| Example | SEM:DET:CARR NEG SEM:DET:CARR? |
| Notes | When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. Note: This detector setting affects the reference channel. There is not a per trace detector. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SELEct to set the mode. |
| Couplings | See Couplings in the Trace Type section. |
| Preset | AVERAge |
| State Saved | Saved in instrument state. |
| Range | Normal Average Peak Sample Negative Peak |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9008 |

Offset Detector

Accesses a menu of functions that enable you to control the detector for offsets. The following choices are available.

- Auto– the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- Normal—the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average—the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak—the detector determines the maximum of the signal within the sweep points.
- Sample—the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak—the detector determines the minimum of the signal within the sweep points.

| | |
|--------------------------|-----------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9041 |

Offset Detector Auto

Sets the detector to the default detection mode for the offsets. This mode is dependent upon the current signal conditions of the offsets.

| | |
|--------------------------|--|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:DETEctor:OFFSet:AUTO ON OFF 1 0 [:SENSe] :SEMAsk:DETEctor:OFFSet:AUTO? |
| Example | SEM:DET:OFFS:AUTO OFF SEM:DET:OFFS:AUTO? |
| Notes | See Couplings in the Trace Type section. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9077 |

Offset Detector Selection

Selects the detector mode for the offsets.

| | |
|------------------------------|--|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | Trace/Detector |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | [:SENSe] :SEMAsk:DETEctor:OFFSet [:FUNctIon] AVERAge NEGative NORMal POSitive SAMPlE [:SENSe] :SEMAsk:DETEctor:OFFSet [:FUNctIon] ? |
| Example | SEM:DET:OFFS AVER SEM:DET:OFFS? |
| Notes | When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. Note: This detector setting has effects all offsets. There is not a per trace detector. You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SELEct to set the mode. |
| Couplings | See Couplings in the Trace Type section. |
| Preset | POSitive |
| State Saved | Saved in instrument state. |
| Range | Normal Average Peak Sample Negative Peak |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9075 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See "[Trig Delay](#) " on page 350

Zero Span Delay Comp

See "[Zero Span Delay Comp On/Off](#)" on page 1255

RF Burst

See "[RF Burst](#) " on page 1267

Absolute Trigger

See "[Absolute Trigger Level](#)" on page 1268

Relative Trigger

See "[Relative Trigger Level](#)" on page 1257

Trig Slope

See "[Trigger Slope](#) " on page 1269

Trig Delay

See "[Trig Delay](#) " on page 354

Periodic Timer

See "[Periodic Timer \(Frame Trigger\)](#) " on page 1259

Period

See "[Period](#) " on page 1260

Offset

See "[Offset](#) " on page 1261

Reset Offset Display

See "[Reset Offset Display](#) " on page 1263

Sync Source

See "[Sync Source](#) " on page 1263

Off

See "[Off](#) " on page 1264

External 1

See "[External 1](#) " on page 1264

Trigger Level

See "Trigger Level " on page 1264

Trig Slope

See "Trig Slope " on page 1265

External 2

See "External 2 " on page 1265

Trigger Level

See "Trigger Level " on page 1266

Trig Slope

See "Trig Slope " on page 1267

RF Burst

See "RF Burst " on page 1267

Absolute Trigger

See "Absolute Trigger Level" on page 1268

Trig Slope

See "Trigger Slope " on page 1269

Trig Delay

See "Trig Delay" on page 365

Auto/Holdoff

See "Auto/Holdoff " on page 1270

Auto Trig

See "Auto Trig " on page 1270

Trig Holdoff

See "Trig Holdoff " on page 1271

Holdoff Type

See "Holdoff Type" on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses a menu of functions that enable you to control the instrument display.

The following keys select how the results are displayed:

- **Abs Pwr Freq**—displays the absolute power levels in dBm and the corresponding frequencies in the text window.
- **Rel Pwr Freq**—displays the relative power levels in dBc and the corresponding frequencies in the text window.
- **Integrated Power**—displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.

"View Selection by Name (Remote Command Only)" on page 1285

"Views Selection by Number (Remote Command only)" on page 1285

View Selection by Name (Remote Command Only)

| | |
|------------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Key Path | View/Display |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW[:SElect] APFReq RPFReq IPOwer CINformation :DISPlay:SEMask:VIEW[:SElect]? |
| Example | DISP:SEM:VIEW IPOW DISP:SEM:VIEW? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SElect to set the mode. |
| Preset | SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD, LTEATDD: APFReq WIMAX OFDMA, WLAN: RPFReq |
| State Saved | Saved in instrument state. |
| Range | Abs Pwr & Freq Rel Pwr & Freq Integrated Power Carrier Info |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |
| Help Map ID | 0 |

Views Selection by Number (Remote Command only)

The following numerical selections determine how the results are displayed:

1. displays the absolute power levels in dBm and the corresponding frequencies in the text window.
2. displays the relative power levels in dBc and the corresponding frequencies in the text window.
3. displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.
- 4.

| | |
|---------------------------|---|
| parameter_ table_24.18745 | 54.42177 |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :DISPlay:SEMask:VIEW:NSElect <integer> :DISPlay:SEMask:VIEW:NSElect? |
| Example | DISP:SEM:VIEW:NSEL 2 DISP:SEM:VIEW:NSEL? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD, LTEATDD: 1 WIMAX OFDMA, WLAN: 2 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | MSR, LTEAFDD, LTEATDD: 4 Other modes: 3 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00, A.10.00 |
| Help Map ID | 0 |

| | |
|--------------------------|------------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9058 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

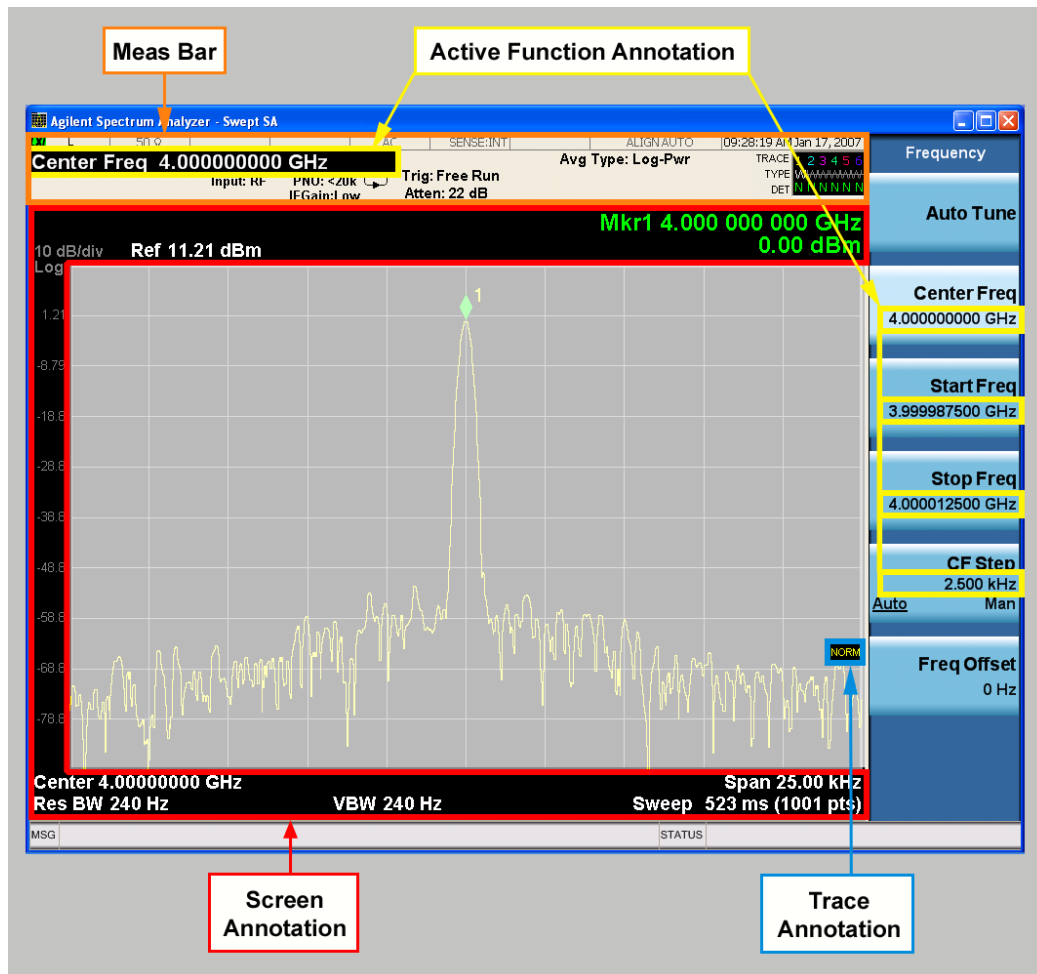
Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.

10 Spectrum Emission Mask Measurement
View/Display



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

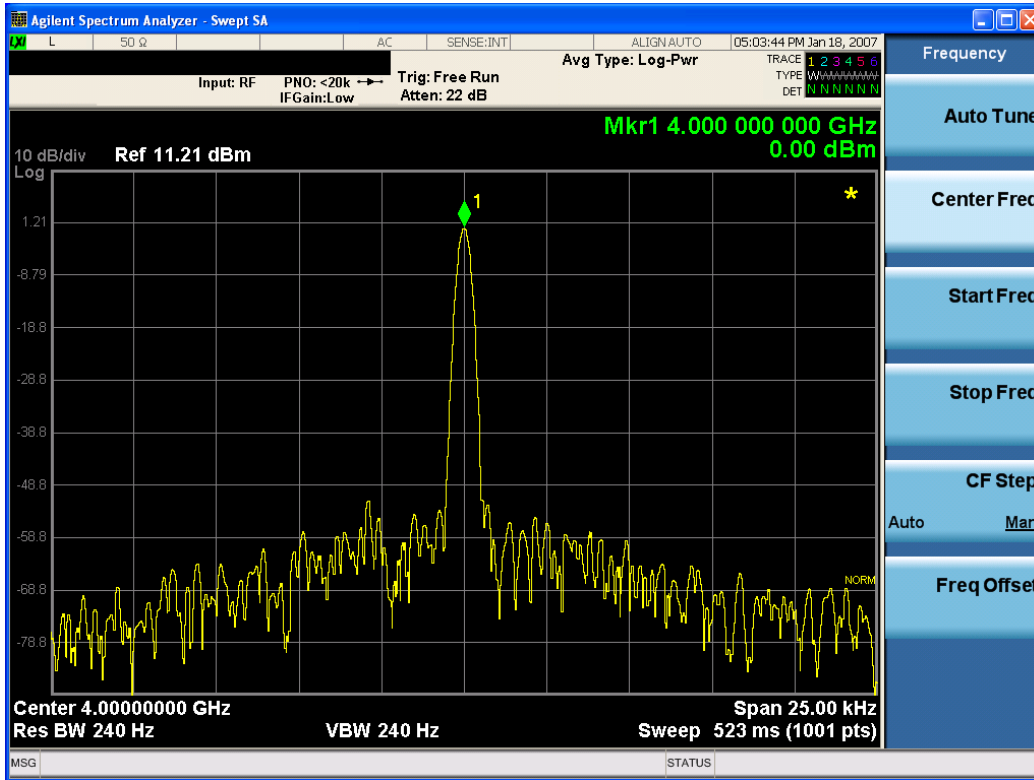
| | |
|-----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

10 Spectrum Emission Mask Measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|-----------------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|-----------------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMoRY:STORe:SCReen:THEMe TDCoLoR TDMoNoChroMe FCOLoR FMONoChroMe :MMEMoRY:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Abs Pwr Freq

Sets the display to the Absolute Peak Power and Frequency view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

["Abs Peak Pwr & Freq \(Total Pwr Ref\)" on page 1294](#)

["Abs Peak Pwr & Freq \(PSD Ref\)" on page 1296](#)

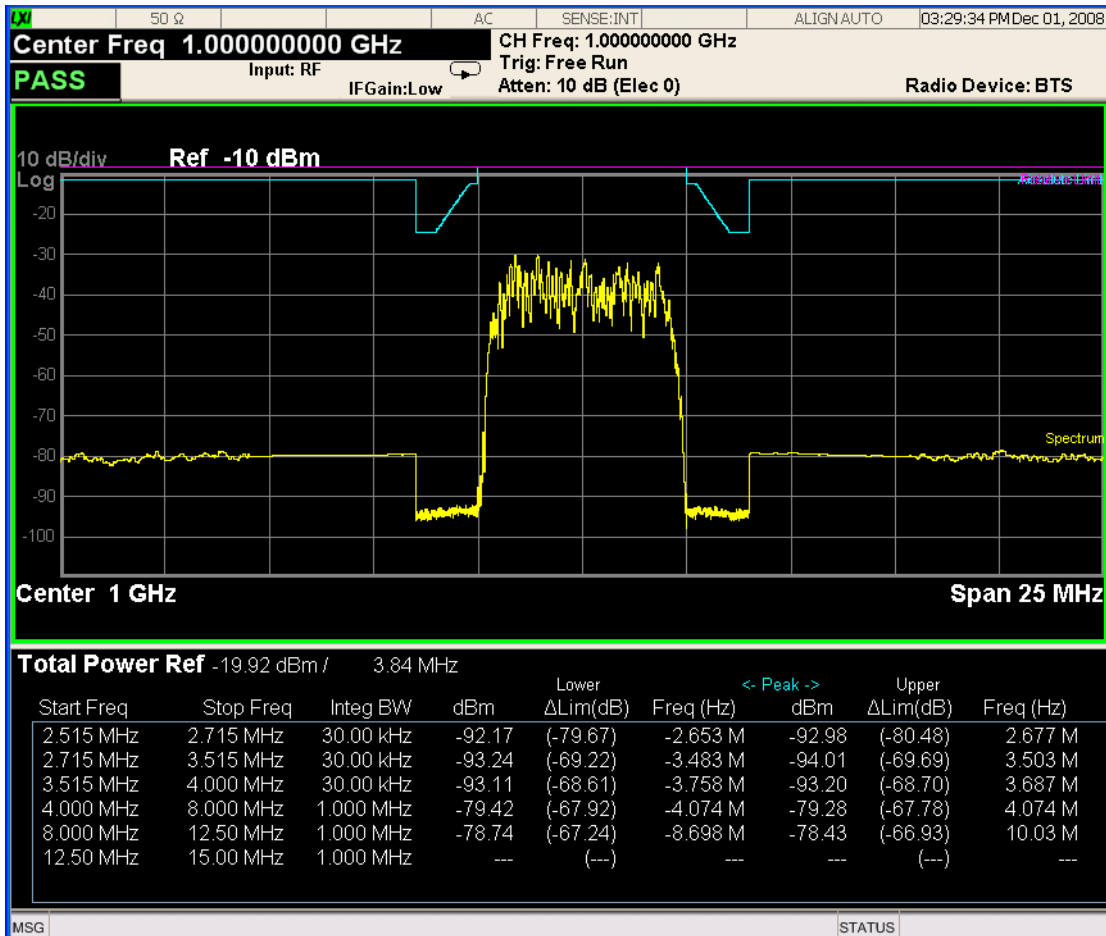
["Abs Peak Pwr & Freq \(Spectrum Pk Ref\)" on page 1297](#)

Abs Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

["Trace Window" on page 1295](#)

["Results Window " on page 1295](#)



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr Ref | n=1 2nd element Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |

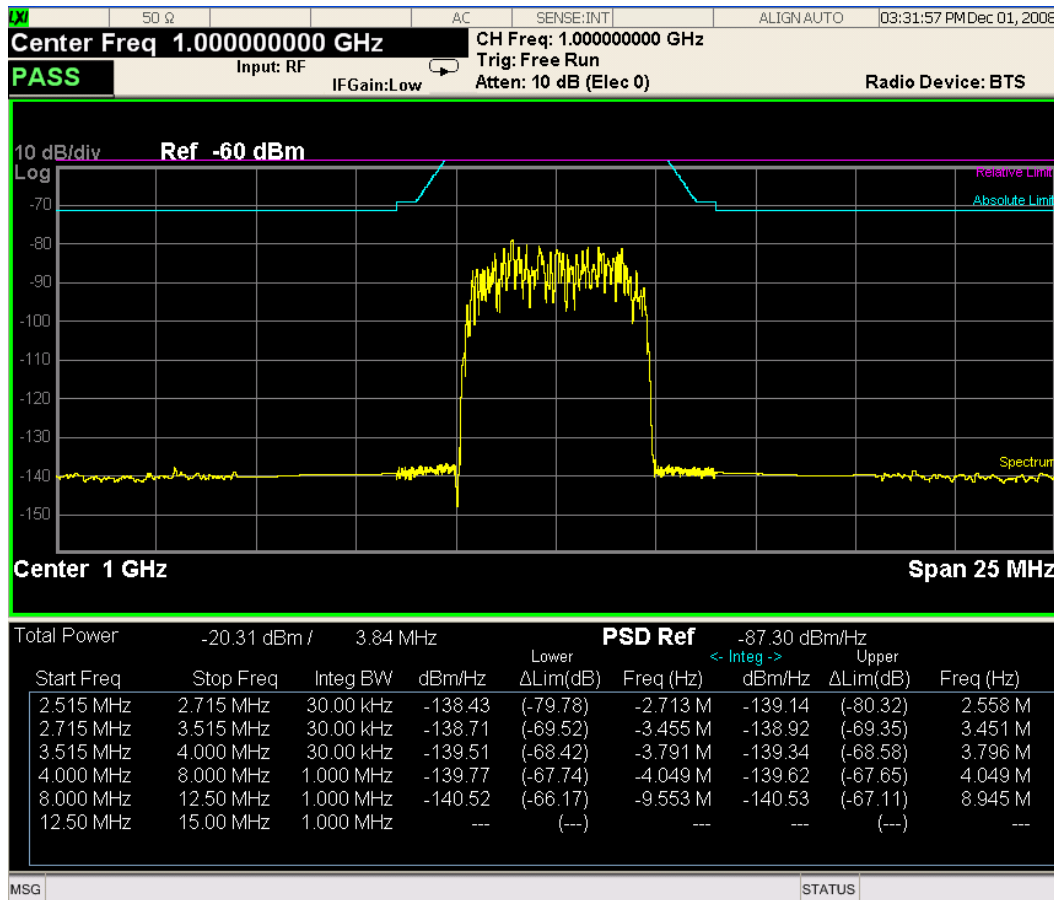
| | |
|------------------|---|
| Lower Peak (dBm) | Absolute peak power on minimum margin point of the negative offset |
| Lower Δlim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset |
| Upper Peak (dBm) | Absolute peak power on minimum margin point of the positive offset |
| Upper Δlim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset |

Abs Peak Pwr & Freq (PSD Ref)

This view consists of the following two windows:

"Trace Window" on page 1296

"Results Window " on page 1297



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| non_parameter_table_20.2402 | | 45.2339 |
|------------------------------------|---|----------------|
| Name | Corresponding Results | |
| Total Pwr | n=1 2nd element Absolute power at the reference area. | |
| | Channel Integration Bandwidth | |
| PSD Ref | n=5 1st element Power spectral density reference at the reference area | |
| Start (Hz) | Start frequency for offset | |
| Stop (Hz) | Stop frequency for offset | |
| Meas BW (Hz) | Measurement bandwidth for offset | |
| Lower (dBm/Hz) | Absolute power spectrum density of the negative offset | |
| Lower Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset | |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset | |
| Upper (dBm/Hz) | Absolute power spectrum density of the positive offset | |
| Upper Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset | |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset | |

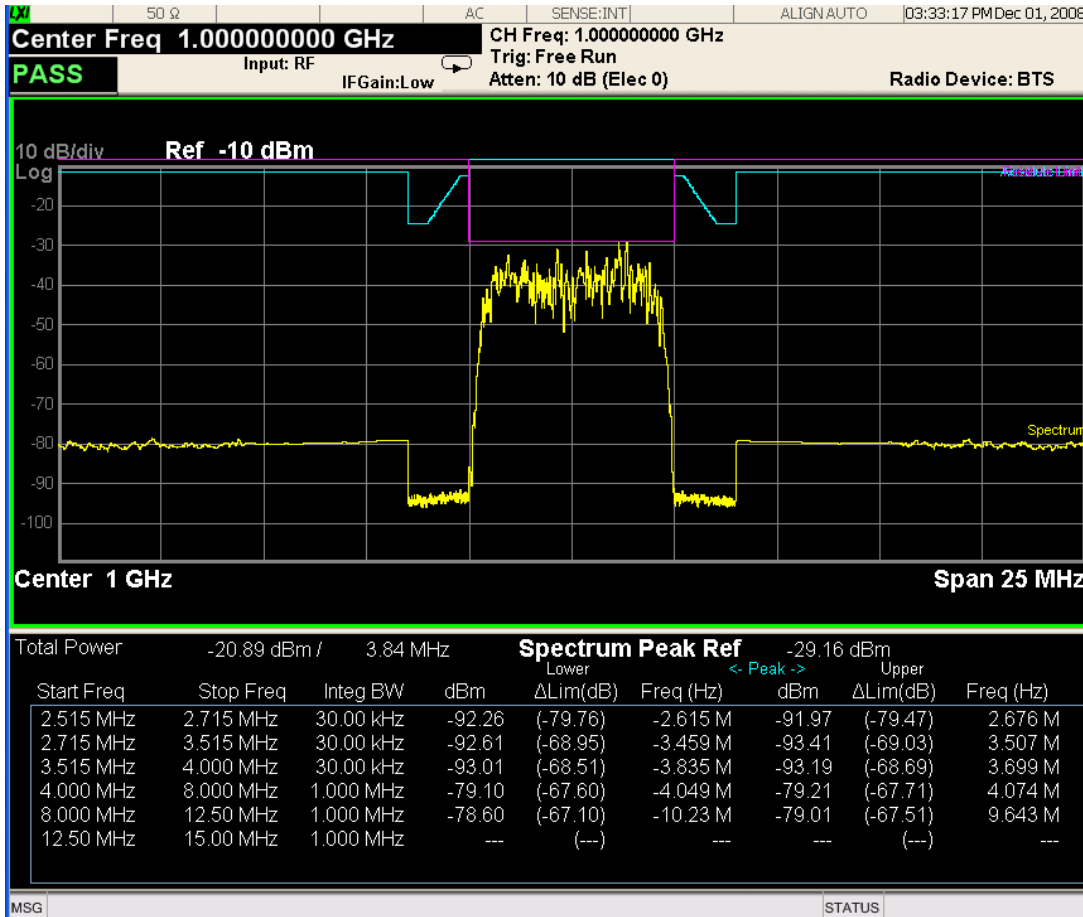
Abs Peak Pwr & Freq (Spectrum Pk Ref)

This view consists of the following two windows:

"Trace Window" on page 1296

"Results Window " on page 1297

10 Spectrum Emission Mask Measurement
View/Display



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr | Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| Spectrum Peak Ref | n=5 1st element Spectrum peak power reference at the reference area |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |

| | |
|-------------------------|---|
| Lower(dBm) | Absolute peak power on minimum margin point of the negative offset |
| Lower Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset |
| Upper (dBm) | Absolute peak power on minimum margin point of the positive offset |
| Upper Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset |

| | |
|--------------------------|---------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9004 |

Rel Pwr Freq

Sets the display to the Relative Peak Power and Frequency view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

"Rel Peak Pwr & Freq (Total Pwr Ref)" on page 1299

"Rel Peak Pwr & Freq (PSD Ref)" on page 1301

"Rel Peak Pwr & Freq (Spectrum Pk Ref)" on page 1302

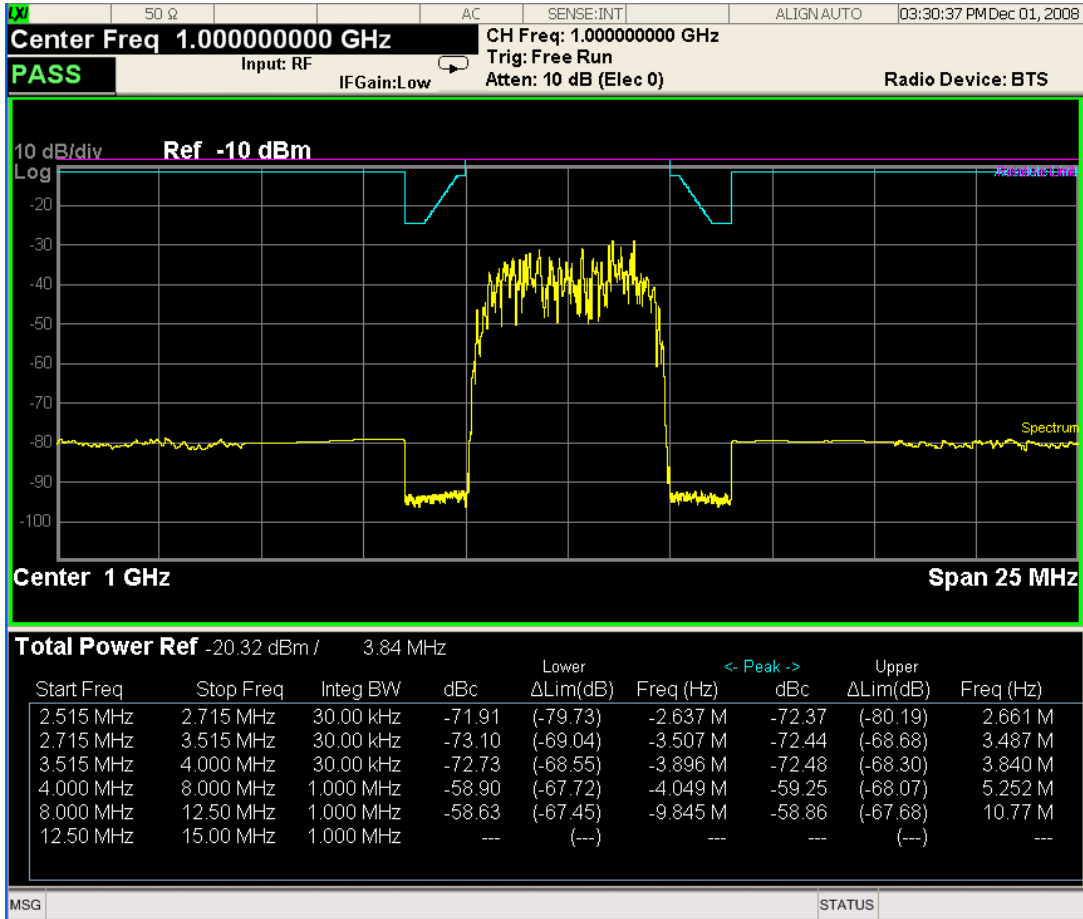
Rel Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

"Trace Window" on page 1300

"Results Window" on page 1300

10 Spectrum Emission Mask Measurement
View/Display



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr Ref | n=1 2nd element Absolute power at the reference area. |
| Start (Hz) | Channel Integration Bandwidth Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |
| Lower Peak (dBc) | Relative peak power on minimum margin point of the negative offset |

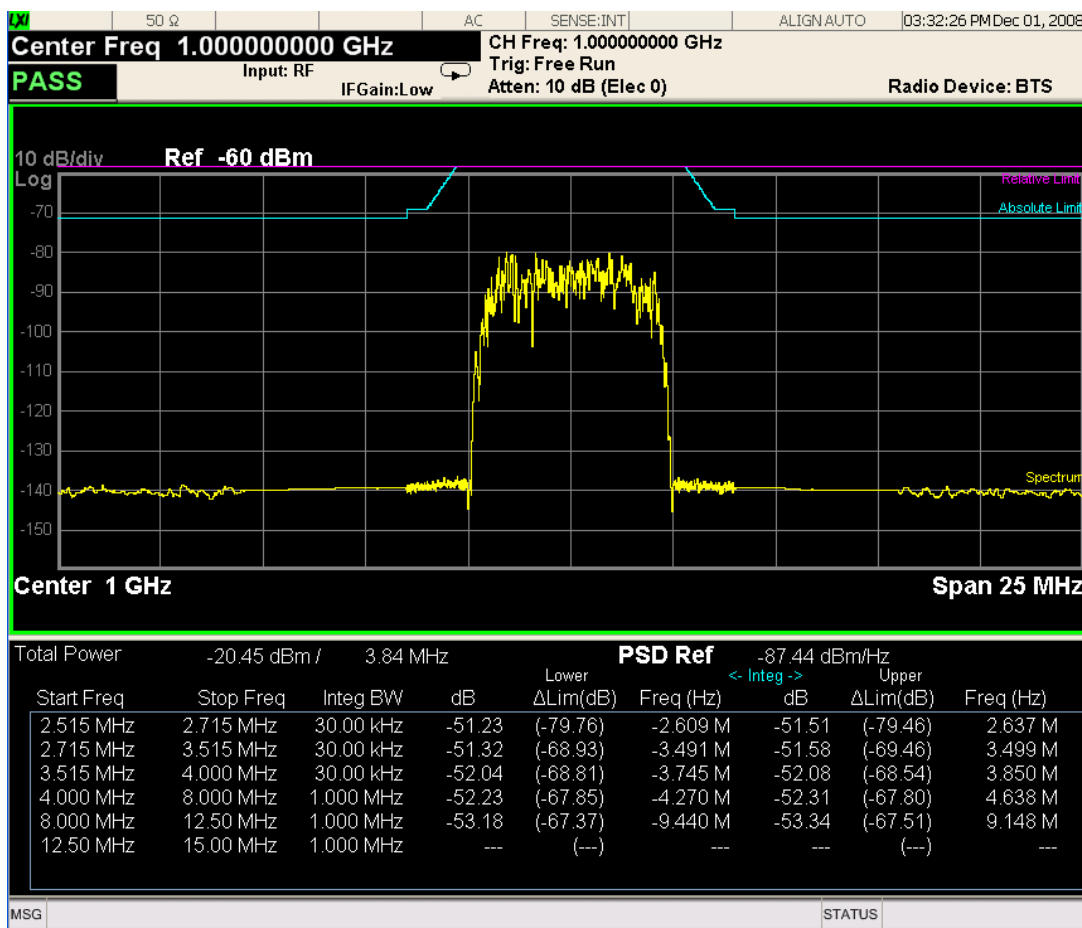
| | |
|------------------|---|
| Lower ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset |
| Upper Peak (dBc) | Relative peak power on minimum margin point of the positive offset |
| Upper ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset |

Rel Peak Pwr & Freq (PSD Ref)

This view consists of the following two windows:

"Trace Window" on page 1301

"Results Window" on page 1302



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

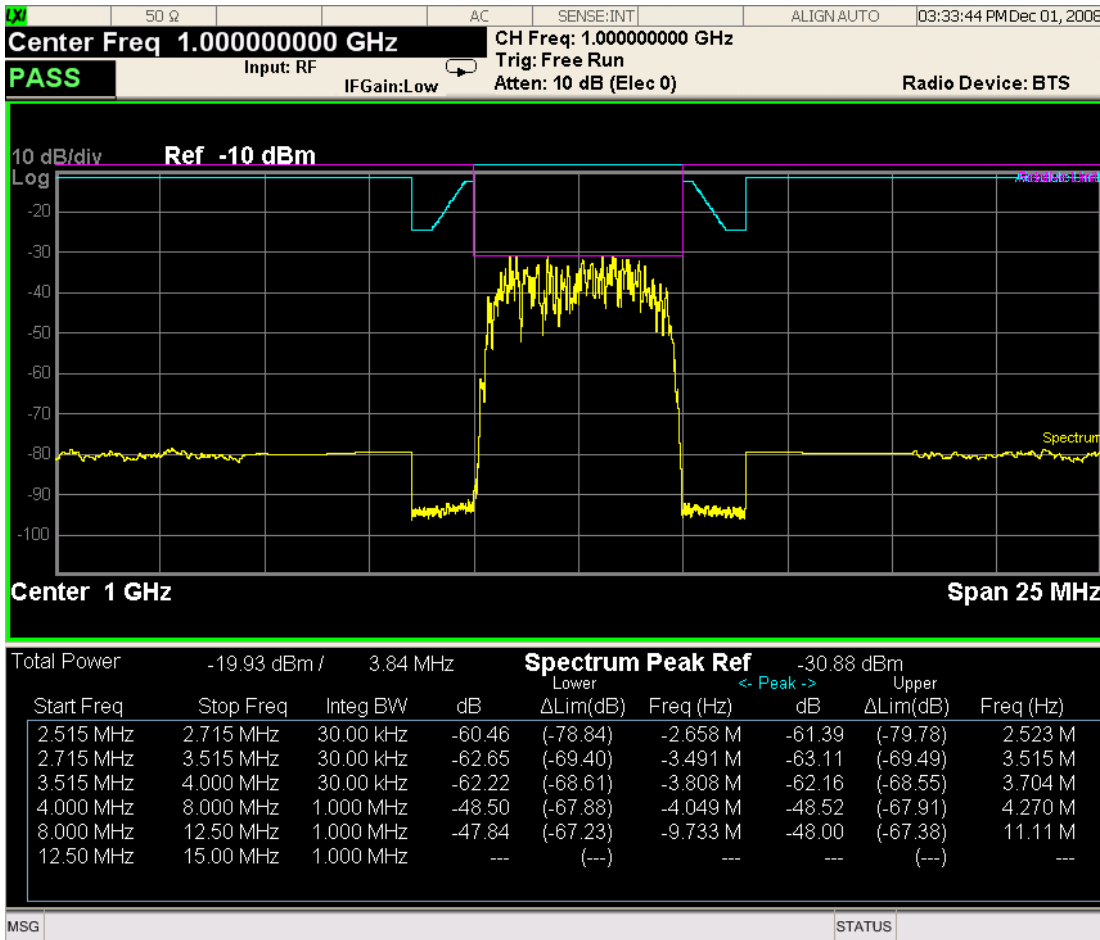
| non_parameter_table_20.2402 45.2339 | |
|--|---|
| Name | Corresponding Results |
| Total Pwr | n=1 2nd element Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| PSD Ref | n=5 1st element Power spectral density reference at the reference area |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |
| Lower (dB) | Relative power spectrum density of the negative offset |
| Lower Δ Lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset |
| Upper (dB) | Relative power spectrum density of the positive offset |
| Upper Δ Lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset |

Rel Peak Pwr & Freq (Spectrum Pk Ref)

This view consists of the following two windows:

["Trace Window" on page 1300](#)

["Results Window" on page 1300](#)



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| | |
|-----------------------------|---|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr | Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| Spectrum Peak Ref | n=5 1st element |
| | Spectrum peak power reference at the reference area |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |

| | |
|-------------------------|---|
| Meas BW (Hz) | Measurement bandwidth for offset |
| Lower Peak (dB) | Relative peak power on minimum margin point of the negative offset |
| Lower Δ Lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Freq (Hz) | Frequency on minimum margin point of the negative offset |
| Upper Peak (dB) | Relative peak power on minimum margin point of the positive offset |
| Upper Δ Lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Freq (Hz) | Frequency on minimum margin point of the positive offset |

| | |
|--------------------------|---------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9005 |

Integrated Power

Sets the display to the Integrated Power view. The views differ depending on the setting of the measurement type (Meas Type) under the Measurement Setup menu.

["Integrated Power \(Total Pwr Ref\)" on page 1304](#)

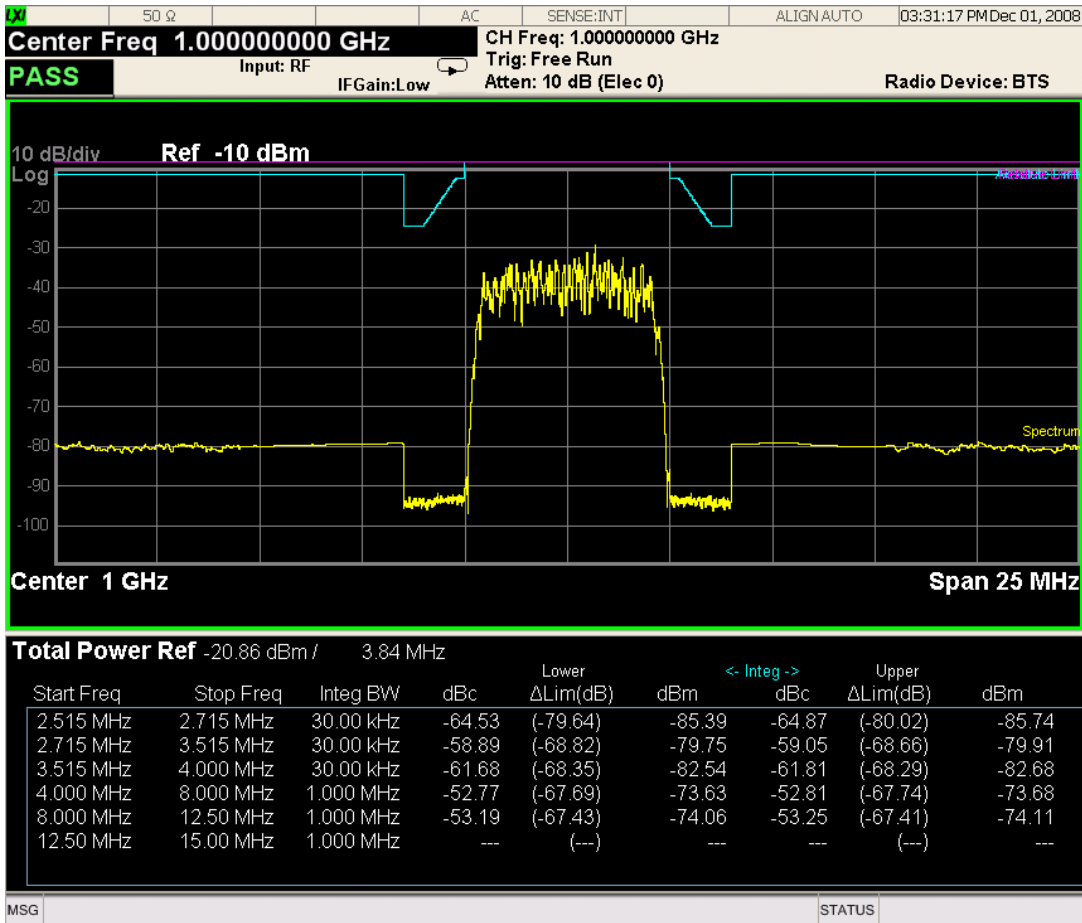
["Integrated Power \(PSD Ref\)" on page 1307](#)

["Integrated Power \(Spectrum Pk Ref\)" on page 1309](#)

Integrated Power (Total Pwr Ref)

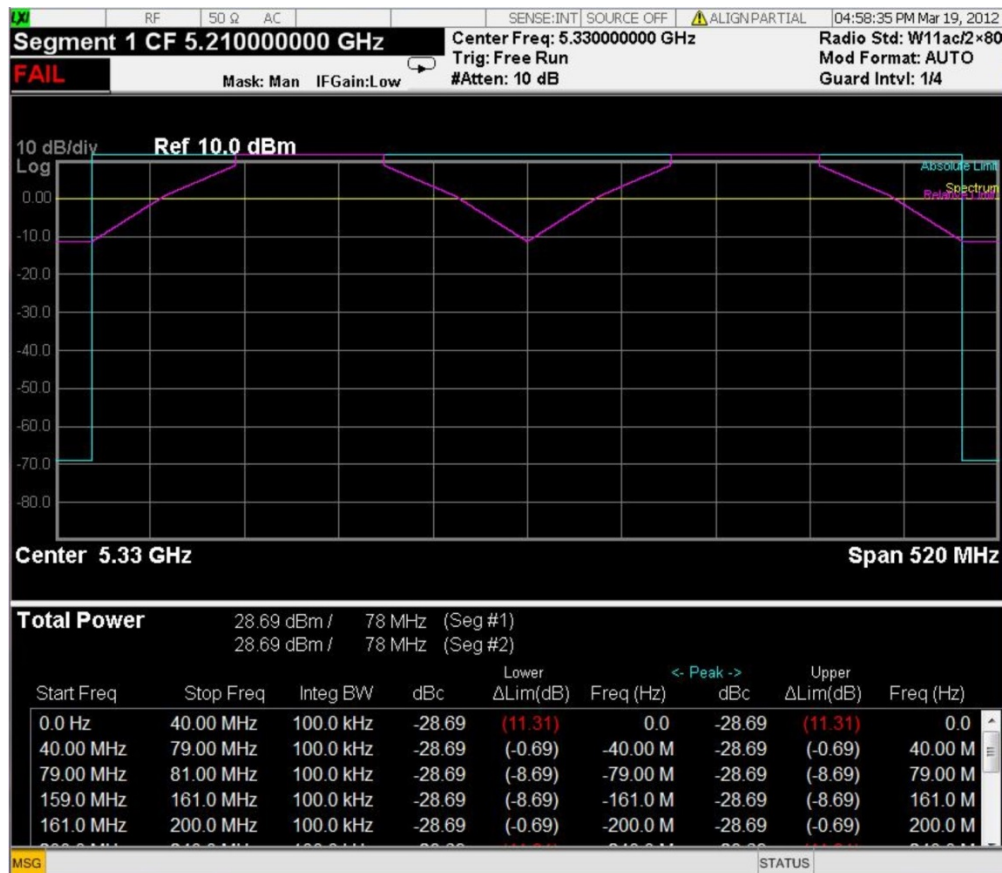
["Trace Window" on page 1306](#)

["Results Window" on page 1306](#)



For WLAN 802.11 ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.

10 Spectrum Emission Mask Measurement
View/Display



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

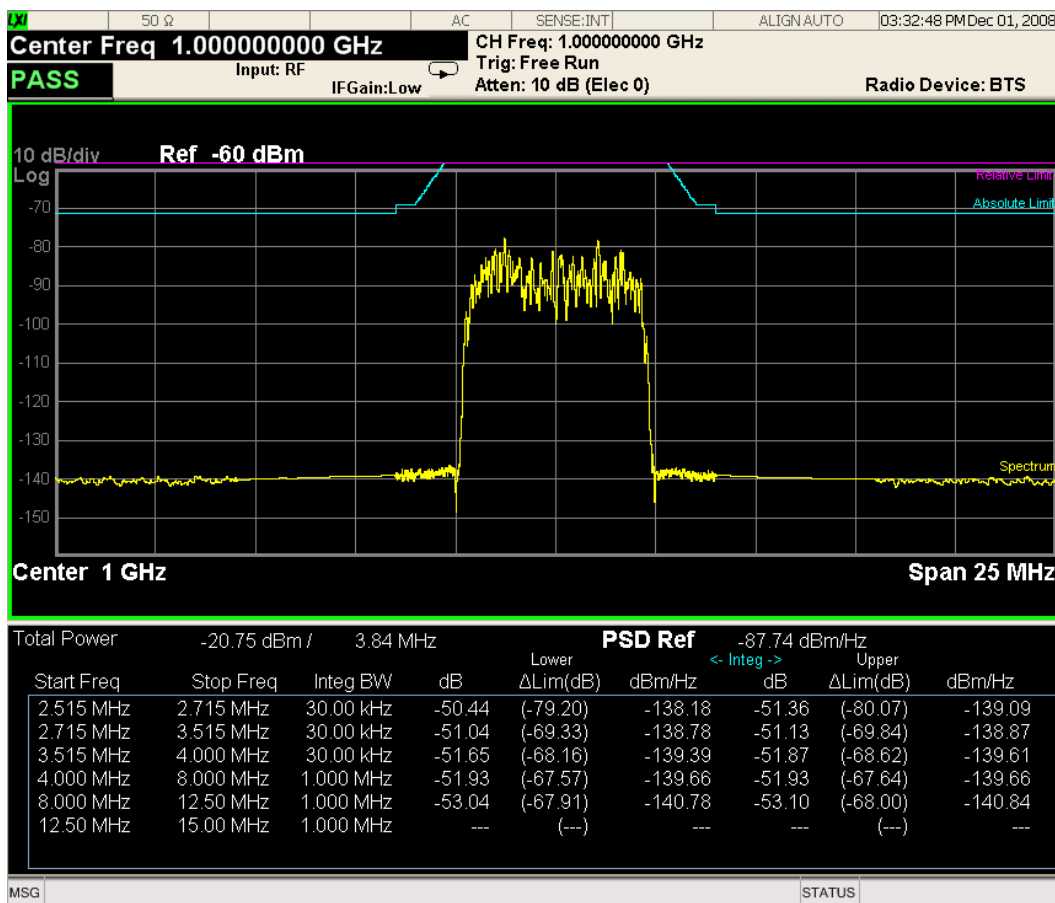
| | |
|-----------------------------|---|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr Ref | n=1 2nd element Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |
| Lower Integ (dBc) | Relative integrated power on the negative offset |
| Lower ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |

| | |
|-------------------|---|
| Lower Integ (dBm) | Absolute integrated power on the negative offset |
| Upper Integ (dBc) | Relative integrated power on the positive offset |
| Upper ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Integ (dBm) | Absolute integrated power on the positive offset |

Integrated Power (PSD Ref)

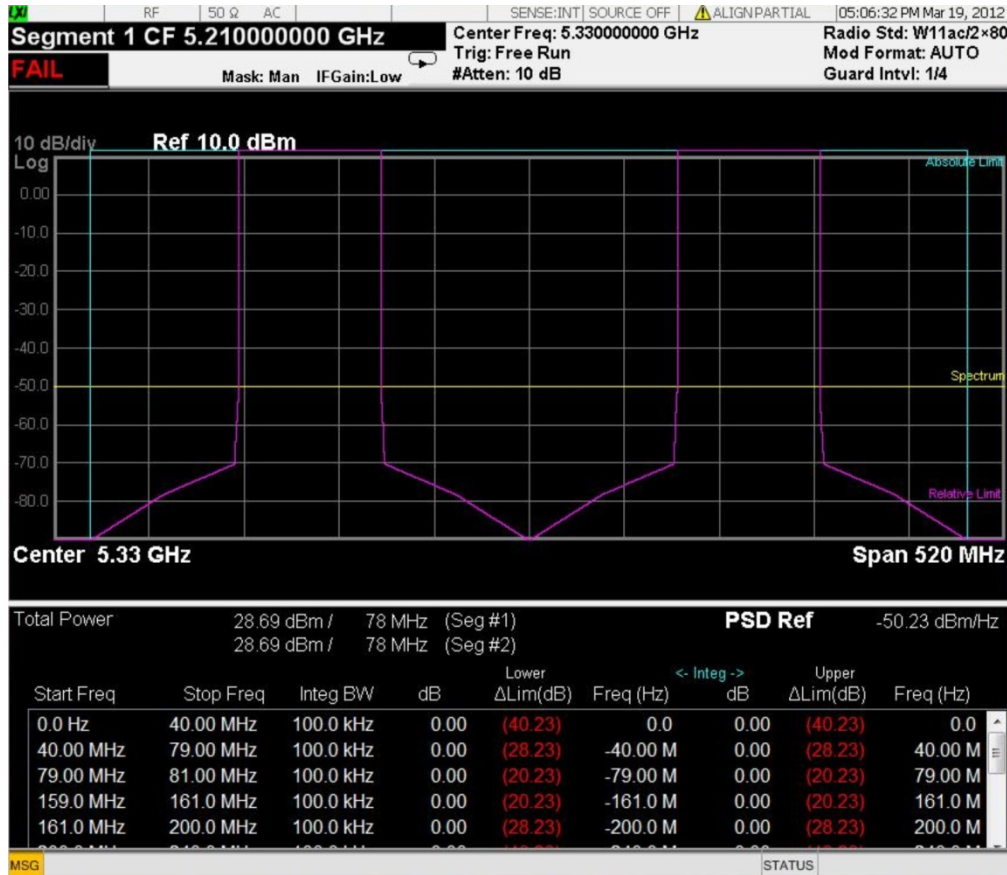
"Trace Window" on page 1308

"Results Window" on page 1308



For WLAN 802.11 ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.

10 Spectrum Emission Mask Measurement
View/Display



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

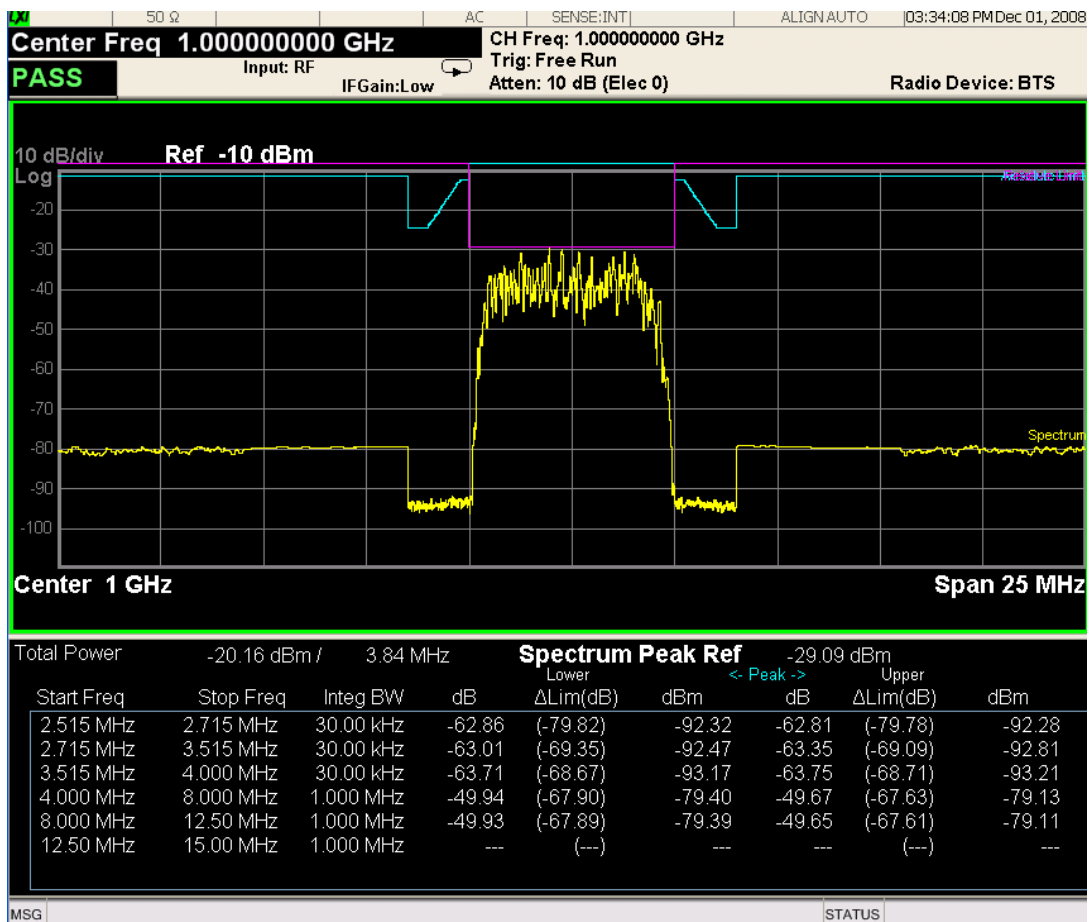
| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr | n=1 2nd element Absolute power at the reference area. |
| PSD Ref | n=5 1st element Channel Integration Bandwidth Power spectral density reference at the reference area |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |

| | |
|-----------------|---|
| Lower (dB) | Relative power spectrum density of the negative offset |
| Lower ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower (dBm/Hz) | Absolute power spectrum density of the negative offset |
| Upper (dB) | Relative power spectrum density of the positive offset |
| Upper ΔLim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper (dBm/Hz) | Absolute power spectrum density of the negative offset |

Integrated Power (Spectrum Pk Ref)

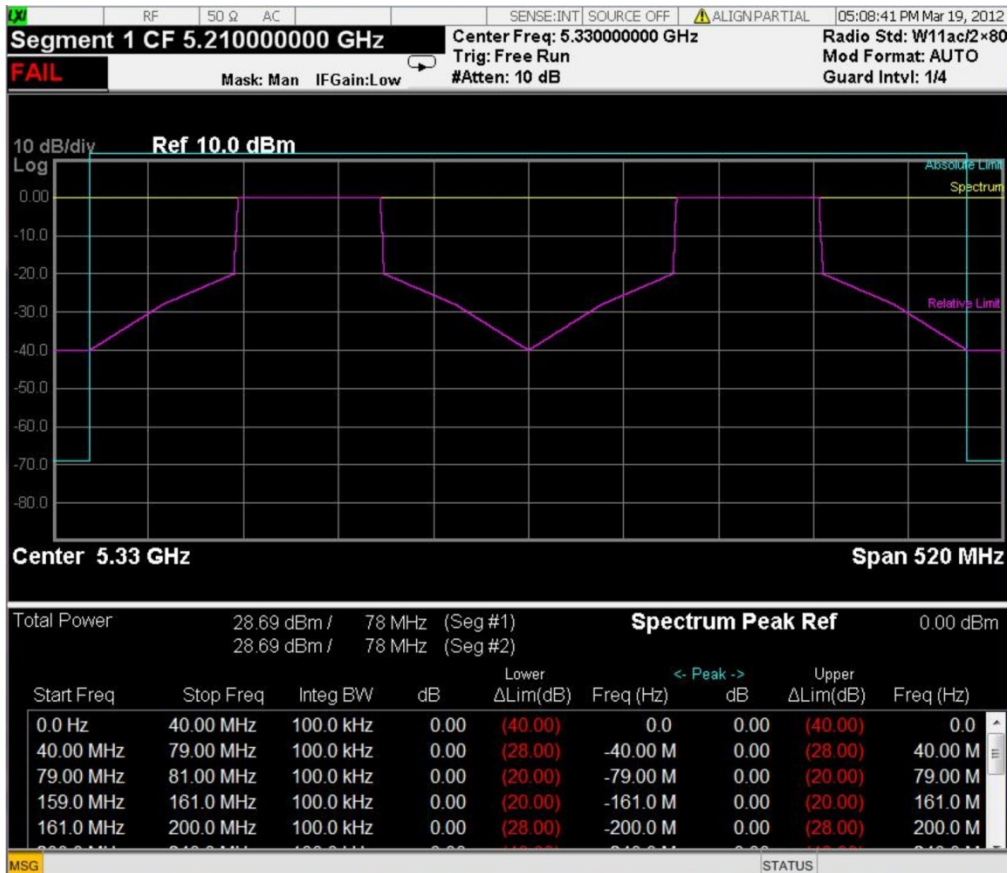
"Trace Window" on page 1306

"Results Window" on page 1306



For WLAN 802.11ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.

10 Spectrum Emission Mask Measurement
View/Display



Trace Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Corresponding Trace | yellow - Combined trace from carrier and each offset |

Results Window

| | |
|-----------------------------|--|
| non_parameter_table_20.2402 | 45.2339 |
| Name | Corresponding Results |
| Total Pwr | Absolute power at the reference area. |
| | Channel Integration Bandwidth |
| Spectrum Peak Ref | n=5 1st element |
| | Peak power at the reference area |
| Start (Hz) | Start frequency for offset |
| Stop (Hz) | Stop frequency for offset |
| Meas BW (Hz) | Measurement bandwidth for offset |
| Lower Peak (dB) | Relative peak power on minimum margin point of the negative offset |

| | |
|-------------------------|---|
| Lower Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the negative offset |
| Lower Peak (dBm) | Absolute peak power on minimum margin point of the negative offset |
| Upper Peak (dB) | Relative peak power on minimum margin point of the positive offset |
| Upper Δ lim (dB) | Minimum margin from limit line which is decided by Fail Mask setting on the positive offset |
| Upper Peak (dBm) | Absolute peak power on minimum margin point of the positive offset |

| | |
|--------------------------|---------------------|
| parameter_table_24.18745 | 54.42177 |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |
| Help Map ID | 9047 |

Limit Lines

Toggles the limit lines display function for the spectrum emission mask measurements On and Off.

| | |
|--------------------------|---|
| parameter_table_24.18745 | 54.42177 |
| Key Path | View/Display |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:SEMask:LLINe:STATe ON OFF 1 0 :CALCulate:SEMask:LLINe:STATe? |
| Example | CALC:SEM:LLIN:STAT OFF CALC:SEM:LLIN:STAT? |
| Notes | You must be in the mode that includes SEM measurement to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |
| Help Map ID | 9006 |

11 Power vs. Time Measurement

This measurement is designed for testing 802.11b signal. It measures power vs. time in the time domain. From envelop of power vs. time trace, transient periods (power-on ramp period or power-down ramp period) can be detected, then the transient periods can be compared with limits specified in specification for pass/fail judgment. Use INSTRument:SElect to set the mode. For measurement results and views, see the following sections:

["Measurement Commands for Power vs. Time Measurement" on page 1314](#)

["Remote Command Results for Power vs Time Measurement" on page 1315](#)

Measurement Commands for Power vs. Time Measurement

The following commands are used to retrieve the measurement results:

:CONFigure:PVTime

:CONFigure:PVTime:NDEFault

:INITiate:PVTime

:FETCh:PVTime[n]?

:READ:PVTime[n]?

:MEASure:PVTime[n]?

For more measurement related commands, see the SENSE subsystem, and the section "[Remote Measurement Functions](#)" on page 2430.

Remote Command Results for Power vs Time Measurement

| N | Results Returned |
|---------------------------|--|
| 0 | Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| not specified or n = 1 | Returns comma-separated scalar results, in the following order: Return -999.0 (BWCC to PSA WLAN) Return Power-on Ramp Time (us) Return Power-down Ramp Time (us) Return overall PASS/FAIL (0:Pass, 1: Fail) Return Power-on Ramp PASS/FAIL (0:Pass, 1: Fail) Return Power-down Ramp PASS/FAIL (0:Pass, 1: Fail) Return Start Level (dBm) for ramp up Return Start Level (dBm) for ramp down Return Stop Level (dBm) for ramp up Return Stop Level (dBm) for ramp down Return Max Ramp Up Time (us) (limit value) Return Max Ramp Down Time (us) (limit value) |
| 2 | Return waveform of Power-on Ramp, the length is determined by Ramp Time Length |
| 3 | Return waveform of Power-down Ramp, the length is determined by Ramp Time Length |
| 4 | Return waveform of full burst, the length is actual burst length |

| Key Path | Meas |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

| | |
|----------------------|--------------------|
| Key Path | Front Panel |
| Initial S/W Revision | A.10.01 |

Ref Value (Burst View)

Sets the absolute power reference.

| | |
|----------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV 5dbm DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV? |
| Couplings | When Y Auto Scale is set to On, this value is automatically determined by the measurement result. When you set this value manually, Y Auto Scale is automatically set to Off. |
| Preset | 10.00 |
| State Saved | Saved in instrument state. |
| Min | -250.0 |
| Max | 250.0 |
| Initial S/W Revision | A.10.01 |

Range

The Range menu allows setting amplitude controls of the instrument.

| | |
|----------------------|----------------------|
| Key Path | AMPTD Y Scale |
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|----------|--------------|
| Key Path | Range |
|----------|--------------|

| | |
|-----------------------|---|
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|--|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize:ATTenuation?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |

| | |
|--------------------------|---|
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|----------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet?</code> |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |

| | |
|----------------------|---------|
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div(Burst View)

Allows you to enter a numeric value to change the vertical display sensitivity.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision? |
| Example | DISP:PVT:VIEW:WIND:TRAC:Y:PDIV 5 dB DISP:PVT:VIEW:WIND:TRAC:Y:PDIV? |
| Couplings | When the Auto Scale is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scale automatically changes to Off. |
| Preset | 10.00 dB |
| State Saved | Saved in instrument state. |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | A.10.01 |

Ref Position(Burst View)

Allows you to set the display reference position to the top, center, or bottom of the display.

| | |
|-----------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTer BOTTom :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | :DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RPOS CENT :DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RPOS? |
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | A.10.01 |

Auto Scaling(Burst View)

Allows you to toggle the Y axis Auto Scaling function between On and Off.

| | |
|-----------------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | :DISP:PVT:VIEW:WIND:TRAC:Y:COUP ON :DISP:PVT:VIEW:WIND:TRAC:Y:COUP? |
| Couplings | When Auto Scaling is On, and you press the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you manually set a value for the Y Rel Value or Y Scale/Div, this parameter is automatically set to Off. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement.

Operation of this key is identical across several measurements. For details about this key, see Attenuation@3003 in the "Common Measurement Functions".

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 1321](#)

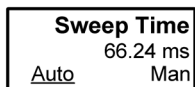
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPle ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

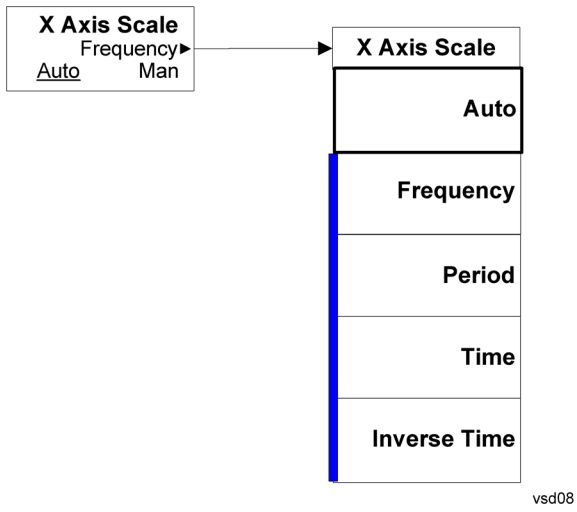
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

Accesses a menu that allows you to control bandwidth settings.

| | |
|----------------------|-----------|
| Key Path | BW |
| Initial S/W Revision | A.10.01 |

Info BW

Sets the information bandwidth. This is the bandwidth used for the power measurement. The optimal setting occurs when the bandwidth is wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise, which reduces dynamic range and diminishes the accuracy of low level measurements.

| | |
|------------------------------|--|
| Key Path | BW |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime: BANDwidth [:RESolution] <bandwidth> [:SENSe] :PVTime: BANDwidth [:RESolution] ? |
| Example | PVT: BAND 1 kHz PVT: BAND? |
| Preset | Hardware Dependent: B25 = 25 MHz WB (40 MHz or wider): if Radio Std is 802.11a/b/g = 25MHz if Radio Std is 802.11n-20M = 25MHz if Radio Std is 802.11n-40M = 40MHz if Radio Std is 802.11ac-20M = 25MHz if Radio Std is 802.11ac-40M = 40MHz if Radio Std is 802.11ac-80M / 80M+ 80M = 80MHz if Radio Std is 802.11ac-160M = 160MHz |
| State Saved | Saved in instrument state. |
| Min | 1 kHz |
| Max | Hardware Dependent: RF Input: Option B25 = 25 MHz Option B40 = 40 MHz Option B1X = 140 MHz |
| Backwards Compatibility SCPI | [:SENSe] :PVTime: IFBW |
| Initial S/W Revision | A.10.01 |

Filter Type

Allows you to select a Gaussian or a Flattop filter. A Gaussian is typically preferred but a Flattop is desirable under certain conditions.

| | |
|-----------------------------|--|
| Key Path | BW |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTTime :BANDwidth :TYPE GAUSSian FLATtop [:SENSe] :PVTTime :BANDwidth :TYPE? |
| Example | PVT:BAND:TYPE GAUS PVT:BAND:TYPE? |
| Notes | This selects either a Gaussian or Flat (Flattop) filter. Gaussian is the better choice when looking at the overall burst, or rising and falling edges, because it has excellent pulse response. For most Time vs. Power measurements, the user is not mainly interested in trading off time domain accuracy vs. noise, but is more interested in total power accuracy vs. noise. If you want to want to examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. –FLATtop – a filter with a flat amplitude response, that provides the best amplitude accuracy. –GAUSSian – a filter with Gaussian characteristics, that provides the best pulse response. |
| Preset | GAUSSian |
| State Saved | Saved in instrument state. |
| Range | Gaussian Flattop |
| Initial S/W Revision | A.10.01 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

11 Power vs. Time Measurement
Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| Key Path | FREQ Channel |
|-----------------------|---|
| Remote Command | <pre>[:SENSe] :FREQuency:CENTer:STEP[:INCRement] <freq> [:SENSe] :FREQuency:CENTer:STEP[:INCRement] ? [:SENSe] :FREQuency:CENTer:STEP:AUTO OFF ON 0 1 [:SENSe] :FREQuency:CENTer:STEP:AUTO?</pre> |
| Example | <pre>FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500 MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO?</pre> |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | Span, RBW, Center frequency If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” |

| | |
|------------------------------|--|
| | warning. |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | Auto ADEMOD: 1 MHz ON |
| State Saved | Saved in instrument state |
| Min | - (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

11 Power vs. Time Measurement
Input/Output

Input/Output

See "[Input/Output](#)" on page 162

Marker

Accesses the menu that allows you to select, set up, and control the markers for the current measurement. Sets the marker control mode as described under **Normal**, **Delta**, and **Off**, below. All interactions and dependencies detailed under the softkey description are enforced when the remote command is sent.

See Marker in the "Common Measurement Functions" for more information.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.03.00 |

Select Marker

Accesses a menu that allows you to activate one or more markers

See Marker in the "Marker Functions" section for more information.

| Key Path | Marker |
|----------------------|---------|
| Initial S/W Revision | A.03.00 |

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, the reference value of the selected marker appears on the Active Function area.

Active Function Display: Marker X-axis value

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

The marker X axis value entered in the active function area will display the marker value to its full entered precision.

| Key Path | Marker |
|----------------|---|
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:PVTime:MARKer[1] 2 ... 12:MODE POSition DELTA OFF :CALCulate:PVTime:MARKer[1] 2 ... 12:MODE? |
| Example | :CALC:PVT:MARK:MODE OFF :CALC:PVT:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears in the Active Function area. Default Active Function: the active function for the selected marker's current control mode. Note that if the current control mode is Off, there is no active function and the active function is turned off. |

| | |
|----------------------|--|
| | Active Function Display: the marker X axis value entered in the active function area will display the marker value to its fully entered precision. |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta Off |
| Initial S/W Revision | A.03.00 |

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.03.00 |

Select Marker

Accesses a menu that allows you to activate one or more markers

See Marker in the “Marker Functions” section for more information.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.03.00 |

Relative To

Selects the marker that the selected marker will be relative to, which is referred to as its “reference marker”.

| | |
|-----------------------|---|
| Key Path | Marker, Properties |
| Mode | TD-SCDMA |
| Remote Command | :CALCulate:PVTime:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:PVTime:MARKer[1] 2 ... 12:REFerence? |
| Example | :CALC:PVT:MARK5:REF 1 :CALC:PVT:MARK5:REF? |
| Notes | When queried, a single value will be returned - the specified marker number’s relative marker. |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |

| | |
|----------------------|------------------|
| Max | 12 |
| Initial S/W Revision | A.01.60 or later |

Marker Trace

Assigns the specified marker to the designated trace.

| | |
|--------------------------|--|
| Key Path | Marker, Properties |
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:PVTime:MARKer[1] 2 ... 12:TRACe RFENvelope MAXHold MINHold RMS70 :CALCulate:PVTime:MARKer[1] 2 ... 12:TRACe? |
| Example | :CALC:PVT:MARK:TRAC MINH :CALC:PVT:MARK:TRAC? |
| Preset | RFENvelope |
| State Saved | Saved in instrument state. |
| Range | RF Envelope Max Hold RF Envelope Min Hold RF Envelope 70us RMS trace |
| Initial S/W Revision | A.03.00 |
| Modified at S/W Revision | A.16.00 |

Couple Marker

When this function is invoked, moving any marker causes an “equal X Axis movement” of every other marker which is active. By “equal X Axis movement” we mean that the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) is preserved, as is the X Axis value of the marker being moved (in the same fundamental X-axis units).

NOTE This may result in markers going off screen.

| | |
|-----------------------|--|
| Key Path | Marker, More |
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:PVTime:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:PVTime:MARKer:COUPle[:STATe]? |
| Example | CALC:PVT:MARK:COUP ON CALC:PVT:MARK:COUP? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.03.00 |

All Markers Off

Turns all markers Off.

| | |
|-----------------------------|--------------------------------|
| Key Path | Marker, More |
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:PVTTime:MARKer:AOff |
| Example | :CALC:PVT:MARK:AOff |
| Initial S/W Revision | A.03.00 |

Marker To

There is no 'Marker To' functionality supported in Power vs. Time measurement so this front-panel key will display a blank menu when pressed

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 2431](#)

["Current Measurement Query \(Remote Command Only\)" on page 2433](#)

["Limit Test Current Results \(Remote Command Only\)" on page 2433](#)

["Data Query \(Remote Command Only\)" on page 2433](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 2434](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 2439](#)

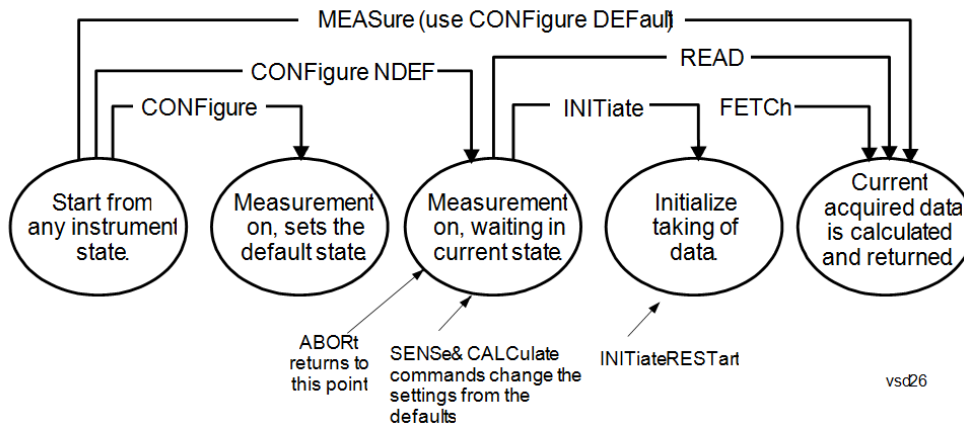
["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 2440](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 2454](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 2455](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEViation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

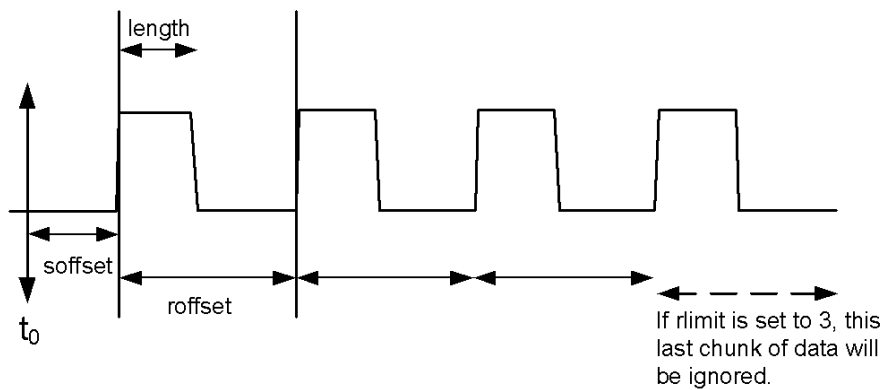
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

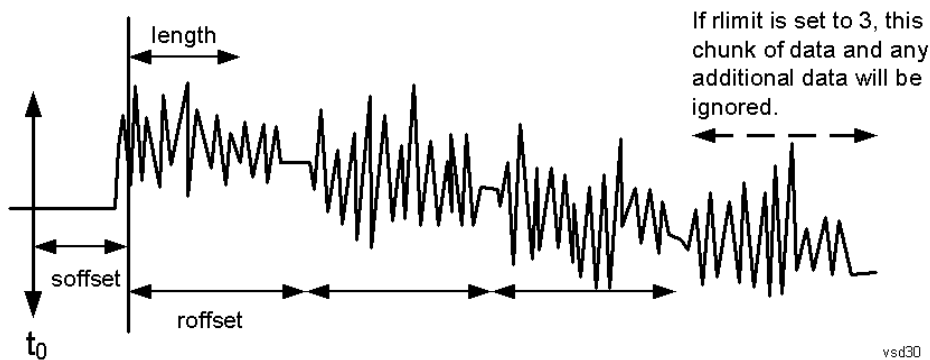
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|---|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLine LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported
Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|----------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

M All
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-----
E :CALC:FPOW:POW1:DEF?

```


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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMal SWAPped :FORMat:BORDER? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Accesses the measurement setup menu for the current measurement.

| Key Path | Meas Setup |
|----------------------|------------|
| Initial S/W Revision | A.10.01 |

Avg Number

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action.

- On - Sets measurement averaging on.
- Off - Sets measurement averaging off.

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe]:PVTime:AVERage:COUNT <integer> [:SENSe]:PVTime:AVERage:COUNT? [:SENSe]:PVTime:AVERage[:STATe] OFF ON 0 1 [:SENSe]:PVTime:AVERage[:STATe]? |
| Example | PVT:AVER:COUN 1 PVT:AVER:COUN? PVT:AVER OFF PVT:AVER? |
| Preset | 10 OFF |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | A.10.01 |

Avg Mode

Selects the type of termination control used for the averaging function. This selection only affects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

| | |
|---|---|
| Exponential averaging SCPI:EXponential | When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set |
|---|---|

| | |
|---------------------------------|---|
| | using the Averages, Avg Bursts key. |
| Repeat averaging SCPI:REPeat | When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes. |

| Key Path | Meas Setup |
|----------------------|--|
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:AVERage:TCONtrol EXPonential REPeat [:SENSe] :PVTime:AVERage:TCONtrol? |
| Example | PVT:AVER:TCON REP PVT:AVER:TCON? |
| Preset | EXPonential |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | A.10.01 |

Avg Type

Specifies the type of trace and result averaging to use.

This parameter is valid only for Measure Trace.

| | |
|--|--|
| KEY:Pwr Avg (RMS) SCPI:RMS POWer | True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging. |
| KEY:Log-Pwr Avg (Video) SCPI:LOG LPOWer | Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power. |

| Key Path | Meas Setup |
|----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:AVERage:TYPE LOG RMS [:SENSe] :PVTime:AVERage:TYPE? |
| Example | PVT:AVER:TYPE LOG PVT:AVER:TYPE? |
| Preset | RMS |
| State Saved | Saved in instrument state. |
| Range | Pwr Avg (RMS) Log-Pwr Avg(Video) |
| Initial S/W Revision | A.10.01 |

Burst Time

This parameter specifies the accurate burst length for RF burst to be measured. It is needed to be set as accurate as possible, or the ramp down time may be lost.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:BURSt:TIME <time> [:SENSe] :PVTime:BURSt:TIME? |
| Example | PVT:BURS:TIME 1.0 PVT:BURS:TIME? |
| Preset | 965.455 us (1024bytes, 11M CCK modulation, long preamble) |
| State Saved | Saved in instrument state. |
| Min | 1.0 us |
| Max | 20.0 ms |
| Backwards Compatibility SCPI | [:SENSe] :PVTime:BURSt |
| Initial S/W Revision | A.10.01 |

Ramp Time Length

This parameter indicates the searching window length from which the ramp on and down is searched. If it is set shorter than actual ramp time, the ramp may be lost.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:RSLength <time> [:SENSe] :PVTime:RSLength? |
| Example | PVT:RSL 1.0 PVT:RSL? |
| Preset | 15.0 us |
| State Saved | Saved in instrument state. |
| Min | 1.0 us |
| Max | 50.0 us |
| Backwards Compatibility SCPI | [:SENSe] :PVTime:RTIME |
| Initial S/W Revision | A.10.01 |

Limits

Accesses the Limits menu allows you to set up the test limit length for the specified time period. You can define ramp up and ramp down segments. The Fail menu will allow you to set the fail/pass criteria of the limit check

| Key Path | Meas Setup |
|----------------------|------------|
| Initial S/W Revision | A.10.01 |

Max Ramp Down Time

It used as threshold which can judge whether the real measured ramp down time can be passed or not. If real measured ramp down time exceeds Max Ramp Down Time, then ramp down time measurement fails, otherwise, it passes.

| Key Path | Meas Setup, Limits |
|-------------------------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:PVTime:LIMit:RDTime <time> :CALCulate:PVTime:LIMit:RDTime? |
| Example | CALC:PVT:LIM:RDT 2us CALC:PVT:LIM:RDT? |
| Preset | 2.0us |
| State Saved | Saved in instrument state. |
| Min | 0.1 us |
| Max | 10.0 us |
| Backwards Compatibility SCPI | :CALCulate:PVTime:LIMit:DRTime |
| Initial S/W Revision | A.10.01 |

Max Ramp Up Time

It used as threshold which can judge whether the real measured ramp up time can be passed or not. If real measured ramp up time exceeds Max Ramp Up Time, then ramp up time measurement fails, otherwise, it passes.

| Key Path | Meas Setup, Limits |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:PVTime:LIMit:RUTime <time> :CALCulate:PVTime:LIMit:RUTime? |
| Example | CALC:PVT:LIM:RUT 2us CALC:PVT:LIM:RUT? |
| Preset | 2.0us |

| | |
|-------------------------------------|--------------------------------|
| State Saved | Saved in instrument state. |
| Min | 0.1 us |
| Max | 10.0 us |
| Backwards Compatibility SCPI | :CALCulate:PVTime:LIMit:URTime |
| Initial S/W Revision | A.10.01 |

Fail

Specifies the fail condition of the limit for the ramp time.

| | |
|----------------------------------|--|
| KEY:PowerUp Ramp SCPI:UP | The measurement reports "FAIL" if the ramp up time exceeds the max ramp up time limit. |
| KEY:Power Down Ramp SCPI:DOWN | The measurement reports "FAIL" if the ramp down time exceeds the max ramp down time limit. |
| KEY:Both SCPI:BOTH | The measurement reports "FAIL" if both Up and Down fail |

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:PVTime:FAIL UP DOWN BOTH :CALCulate:PVTime:FAIL? |
| Example | CALC:PVT:FAIL UP CALC:PVT:FAIL? |
| Preset | BOTH |
| State Saved | Saved in instrument state. |
| Range | PowerUp Ramp Power Down Ramp Both |
| Backwards Compatibility SCPI | [:SENSe] :PVTime:LIST:FAIL |
| Initial S/W Revision | A.10.01 |

Threshold

Accesses the setup menu to set the thresholds used to find ramp up and ramp down part in burst signal.

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

Ramp Up Start Level

It specifies the relative value between ramp up start level and max power level measured in ramp time length.

| Key Path | Meas Setup, Threshold |
|-------------------------------------|--|
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :PVTime:THReshold:UP:STARt <rel_ampl></code> <code>[:SENSe] :PVTime:THReshold:UP:STARt?</code> |
| Example | PVT:THR:UP:STAR -50.0 PVT:THR:UP:STAR? |
| Notes | This BWCC command will set the start level of both power-up and power-down at one time. Please note, the unit of the level is percent and they will be converted to dB by 20log. |
| Preset | -20.000 dB |
| State Saved | Saved in instrument state. |
| Min | -120.000 dB |
| Max | 0.000 dB |
| Backwards Compatibility SCPI | <code>[:SENSe] :PVTime:LIST:LEVel:STARt</code> |
| Initial S/W Revision | A.10.01 |

Ramp Up End Level

It specifies the relative value between ramp up end level and max power level measured in ramp time length.

| Key Path | Meas Setup, Threshold |
|-------------------------------------|--|
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :PVTime:THReshold:UP:STOP <rel_ampl></code> <code>[:SENSe] :PVTime:THReshold:UP:STOP?</code> |
| Example | PVT:THR:UP:STOP -50.0 PVT:THR:UP:STOP? |
| Notes | This BWCC command will set the start level of both power-up and power-down at one time. Please note, the unit of the level is percent and they will be converted to dB by 20log. |
| Preset | -0.915 dB |
| State Saved | Saved in instrument state. |
| Min | -120.000 dB |
| Max | 0.000 dB |
| Backwards Compatibility SCPI | <code>[:SENSe] :PVTime:LIST:LEVel:STARt</code> |
| Initial S/W Revision | A.10.01 |

Ramp Down Start Level

It specifies the relative value between ramp down start level and max power level measured in ramp time length

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Threshold |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:THReshold:DOWN:STARt <rel_ampl> [:SENSe] :PVTime:THReshold:DOWN:STARt? |
| Example | PVT:THR:DOWN:STAR -50.0 PVT:THR:DOWN:STAR? |
| Notes | This BWCC command will set the stop level of both power-up and power-down at one time. Please note, the unit of the level is percent and they will be converted to dB by 20log. |
| Preset | -0.915 dB |
| State Saved | Saved in instrument state. |
| Min | -120.000 dB |
| Max | 0.000 dB |
| Backwards Compatibility SCPI | [:SENSe] :PVTime:LIST:LEVel:END |
| Initial S/W Revision | A.10.01 |

Ramp Down End Level

It specifies the relative value between ramp down end level and max power level measured in ramp time length.

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Threshold |
| Mode | WLAN |
| Remote Command | [:SENSe] :PVTime:THReshold:DOWN:STOP <rel_ampl> [:SENSe] :PVTime:THReshold:DOWN:STOP? |
| Example | PVT:THR:DOWN:STOP -50.0 PVT:THR:DOWN:STOP? |
| Notes | This BWCC command will set the stop level of both power-up and power-down at one time. Please note, the unit of the level is percent and they will be converted to dB by 20log. |
| Preset | -20.000 dB |
| State Saved | Saved in instrument state. |
| Min | -120.000 Db |
| Max | 0.000 dB |
| Backwards Compatibility SCPI | [:SENSe] :PVTime:LIST:LEVel:END |

| | |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |
|----------------------|---------|

Meas Preset

Returns parameters for the current measurement to those set by the factory.

| | |
|-----------------------|-------------------------|
| Key Path | Meas Setup, More |
| Mode | WLAN |
| Remote Command | :CONFigure:PVTime |
| Example | CONF:PVT |
| Initial S/W Revision | A.10.01 |

11 Power vs. Time Measurement
Mode

Mode

See "[Mode](#)" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1372 for more information.

| | |
|--------------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPle ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODes | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPUt | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGN | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Mode | LTETDD, LTE,, LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:PVTime:MARKer[1] 2 ... 12:MAXimum |
| Example | CALC:PVT:MARK2:MAX |
| Initial S/W Revision | A.03.00 |

11 Power vs. Time Measurement
Print

Print

See "[Print](#) " on page 277

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.03.00 |

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode’s settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled State Register <register number>” is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 1382.

| Key Path | Recall |
|-----------------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MEMORY:LOAD:STATE 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

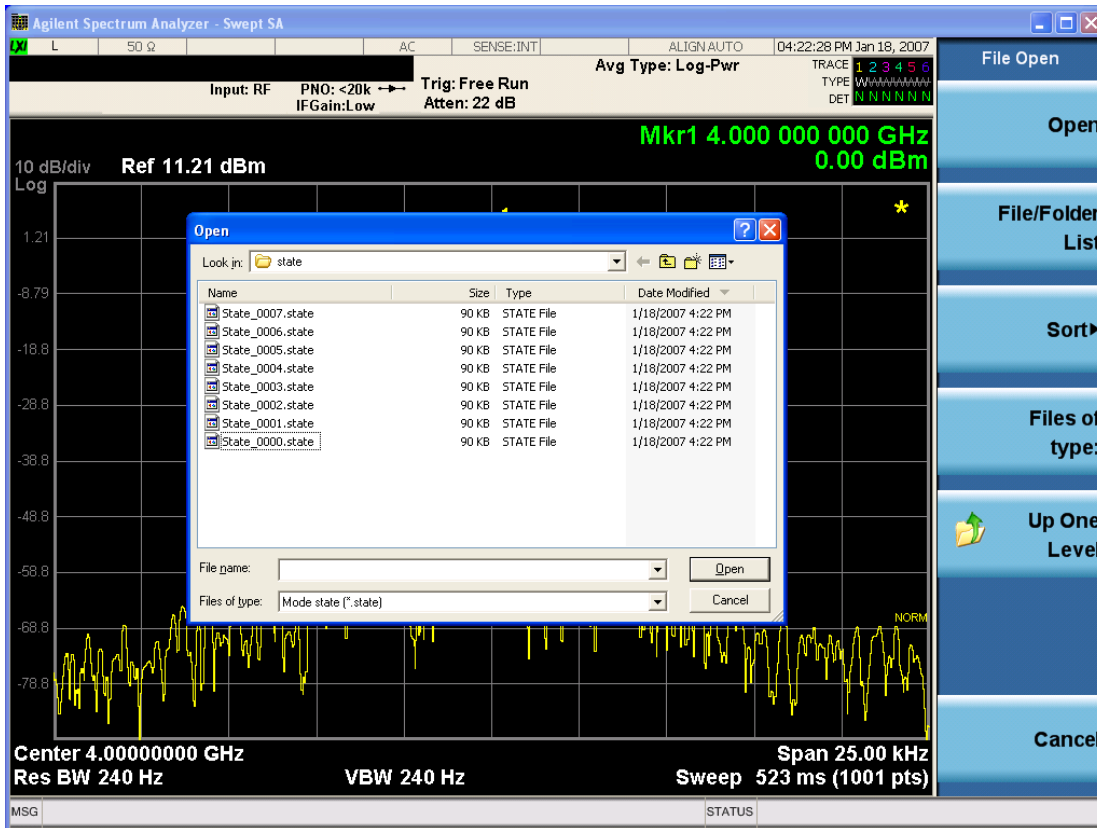
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|--|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|-----------------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|-----------------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMoRY:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1390

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|-----------------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

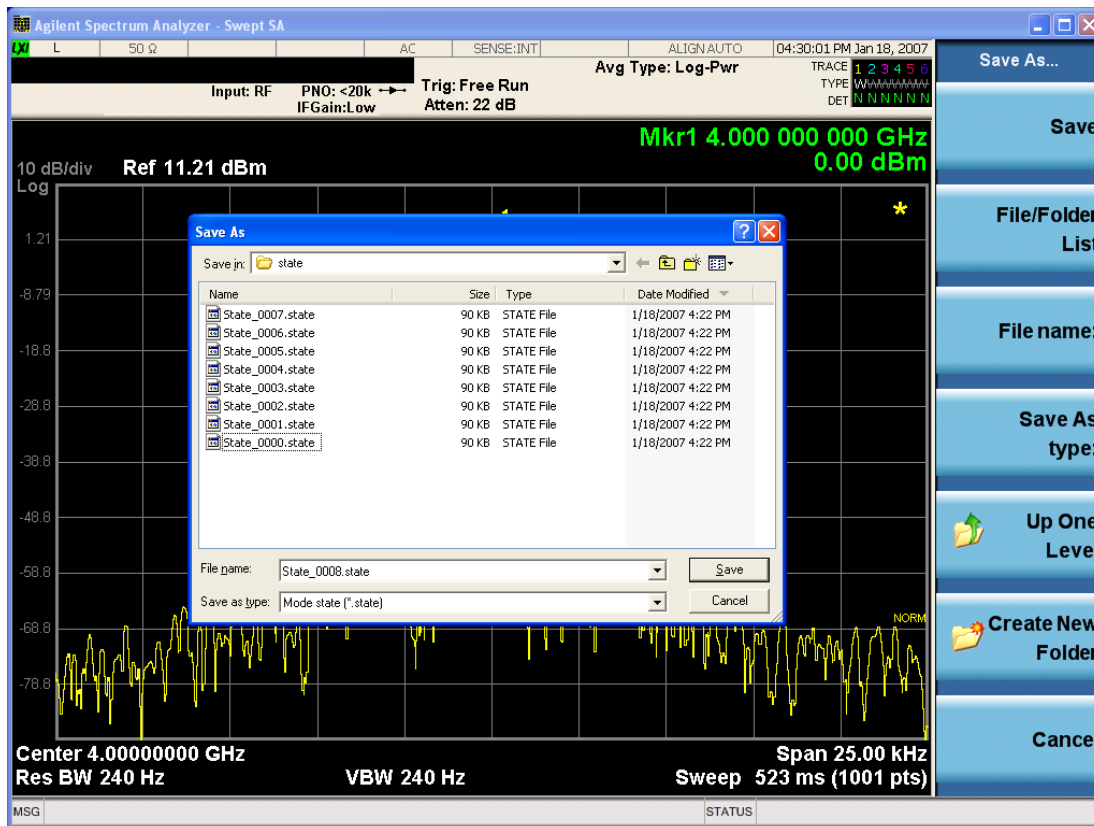
| | |
|-----------------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMoRY:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See "[More Information](#)" on page 1395

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR "(empty)" if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision Prior to A.02.00

Mass Storage Remove Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:RDIRECTory <directory_name> |
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|-----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Remote Command | :MMEM:STOR:SEQUences: SLIST ALIST SAAList SSTep "MySequence.txt" |
| Example | :MMEM:STOR:SEQ:SLIST "MySequence.txt" |
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none"> -CSV (Comma delimited) (*.csv) -Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|----------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "To File . . ." on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

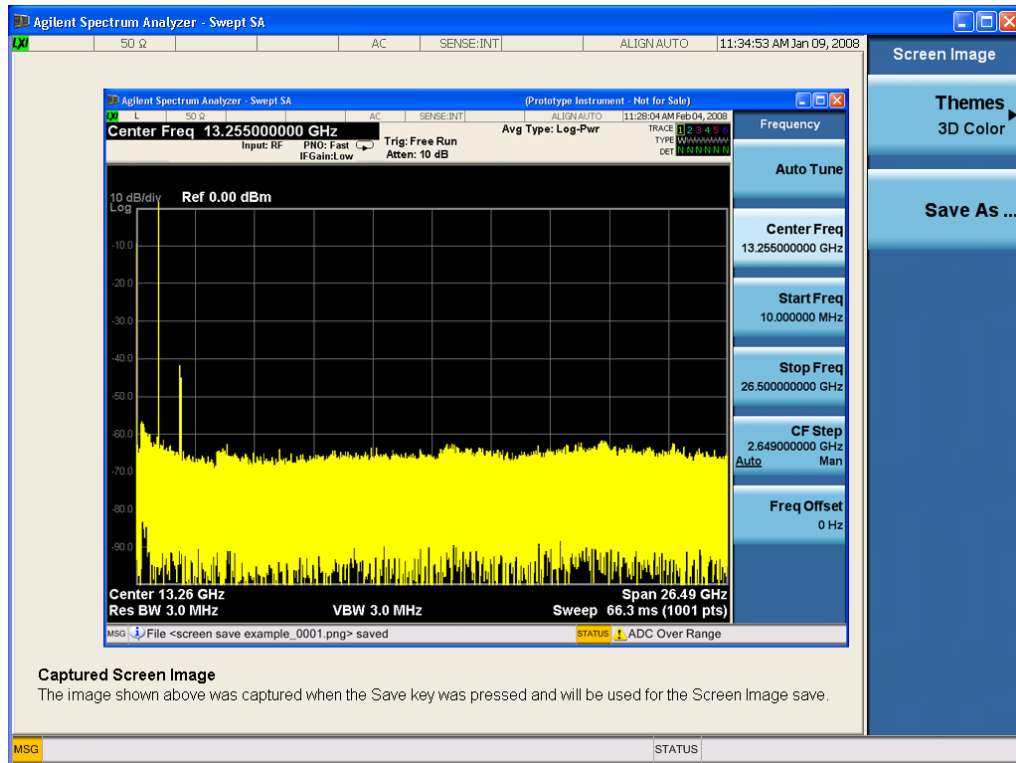
Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:

11 Power vs. Time Measurement

Save



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 1407

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------------|---|
| Remote Command | :OUTPut[:EXTeRnal][:STATe] ON OFF 1 0 :OUTPut[:EXTeRnal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTeRnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|-----------------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1410](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1410 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1410 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| | |
|----------------------|---|
| Key Path | Source, Amplitude |
| Dependencies | This key is unavailable, and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 1414](#),

"W-CDMA Channel Number Ranges" on page 1415, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1416, and "LTE FDD Channel Number Ranges" on page 1418.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|----------------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| Band IX | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| Band X | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| | | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | Downlink | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| Band XI | Uplink | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| | | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Downlink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| | | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| Band XII | Uplink | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| Band XIII | Uplink | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| Band XIV | Uplink | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | Downlink | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| | | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| Band XIX | Uplink | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | Downlink | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |
| | | | |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 * N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | | 2110 | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | | 1930 | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | | 1805 | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | | 2110 | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | | 869 | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | | 875 | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | | 2620 | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | | 925 | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | | 1844.9 | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | | 2110 | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | | 1475.9 | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | | 729 | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | | 746 | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | | 758 | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | | 734 | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | | 860 | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 – 6149 | 830 | 24000 | 24000 – 24149 |
| 20 | 791 | 6150 | 6150 – 6449 | 832 | 24150 | 24150 – 24449 |
| 21 | 1495.9 | 6450 | 6450 – 6599 | 1447.9 | 24450 | 24450 – 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 – 8039 | 1626.5 | 25700 | 25700 – 26039 |
| 25 | 1930 | 8040 | 8040 – 8689 | 1850 | 26040 | 26040 – 26689 |
| 26 | 859 | 8690 | 8690 – 9039 | 814 | 26690 | 26690 – 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 – 36199 | 1900 | 36000 | 36000 – 36199 |
| 34 | 2010 | 36200 | 36200 – 36349 | 2010 | 36200 | 36200 – 36349 |
| 35 | 1850 | 36350 | 36350 – 36949 | 1850 | 36350 | 36350 – 36949 |
| 36 | 1930 | 36950 | 36950 – 37549 | 1930 | 36950 | 36950 – 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|---------------|
| 37 | 1910 | 37550 | 37550 - 37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 - 38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 - 38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 - 39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900-1920 MHz | 9504 to 9596 |
| | 2010-2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850-1910 MHz | 9254 to 9546 |
| | 1930-1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910-1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570-2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300-2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880-1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|----------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEvice BTS MS :SOURce:RADio:DEvice? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|---|
| | <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm" |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613.](#)

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540.](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command `:SOURce:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...`

(For additional description of each item, see Notes below ["For Setup SCPI" on page 1472](#) "For Setup SCPI".)

`:SOURce:RADio:ARB:SEQuence[:MWAveform]? <filename>`

(For additional description of each item, see Notes ["For Query SCPI" on page 1473](#) below.)

Example For setup:

`>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3`

Or

`>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1 M3`

For query, must specify which waveform sequence file to query.

`>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"`

Or

`>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",`

Notes For Setup SCPI

For the Setup SCPI command, the parameters are:

`<filename>` - String Type
This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

`<waveform1>` - String Type
This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1. wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
If the waveform sequence file name is empty, an error is generated.
If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
|----------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
|----------|--|

| | |
|--------------|---|
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
|--------------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|----------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|--|
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int> |
| Example | SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Dependencies | This key is only available if the currently selected slot is in the trial state or the lock required state. |
| Initial S/W Revision | A.05.00 |

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

| | |
|----------------|--|
| Remote Command | :SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int> |
| Example | :SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked" |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an |

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"> |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated.and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|-----------------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| Key Path | Source, List Sequencer |
|-----------------------|---|
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| Key Path | Source, List Sequencer |
|-----------------------|---|
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|--|
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTernal EXTernal2 KEY BUS EXTernal4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTernal4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|--|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

Initial S/W Revision A.05.00

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path **Source, List Sequencer, List Sequencer Setup, Waveform**

Example :SOUR:LIST:STEP2:SET:WAV "Cont"

Notes SCPI is supported after A.09.40

Initial S/W Revision A.05.00

Off

Disable RF output of the current step.

Key Path **Source, List Sequencer, List Sequencer Setup, Waveform**

Example :SOUR:LIST:STEP2:SET:WAV "Off"

Notes SCPI is supported after A.09.40

Initial S/W Revision A.05.00

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even if required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> – specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:DEFault:DIRectory <string>
 :SOURce:RADio:ARB: DEFault:DIRectory?

Example :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"
 :SOUR:RAD:ARB:DEF:DIR?

State Saved Persistent, survives a power cycle and a preset but not saved in the instrument state

Initial S/W Revision A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMediate INTernal KEY BUS EXTernal2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|----------|---|
| R | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... |
| e | :SOURce:LIST:SETup:RADio:BAND? |
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| E | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM |
| X | :SOUR:LIST:SET:RAD:BAND? |
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e

N The command is to setup below parameter array of whole list sequence.

O Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 2591](#).

t If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on
e page 2587](#).

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|--|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTInuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
:SOURce:LIST:SETup:TOCount?

Example :SOUR:LIST:SET:TOC 1s,2s,3s
:SOUR:LIST:SET:TOC?
:SOUR:LIST:SET:TOC 5,6,7
:SOUR:LIST:SET:TOC?

Notes The command is to setup below parameter array of whole list sequence.
Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 2616](#) and ["Play Count" on page 2617](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
If current ["Step Duration" on page 2616](#) is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"

Dependencies The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
:SOURce:LIST:SETup:OUTPut:TRIGger ?

Example :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON
:SOUR:LIST:SET:OUTP:TRIG?

Notes The command is to setup below parameter array of whole list sequence.
Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 2618](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Ref Value(Burst View)

Allows you to set the display X reference value.

| | |
|-----------------------|--|
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel? |
| Example | DISP:PVT:VIEW:WIND:TRACE:X:RLEV 1s DISP:PVT:VIEW:WIND:TRACE:X:RLEV? |
| Notes | If X Auto Scale is On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scale is automatically set to Off. |
| Couplings | See Notes |
| Preset | 0 s |
| State Saved | Saved in instrument state. |
| Min | -10.0 s |
| Max | 10.00 s |
| Initial S/W Revision | A.10.01 |

Scale/Div(Burst View)

Allows you to set the display X scale/division value.

| | |
|-----------------------|---|
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision? |
| Example | :DISP:PVT:VIEW:WIND:TRACE:X:PDIV 1ms :DISP:PVT:VIEW:WIND:TRACE:X:PDIV? |
| Notes | If X Auto Scale is set to On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scale is automatically set to Off. |
| Couplings | See Notes |
| Preset | 1.0 ms |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 1.00 ns |
| Max | 1.00 s |
| Initial S/W Revision | A.10.01 |
| MIN/MAX/DEF Support | Yes |

Ref Position(Burst View)

Allows you to set the X reference position to the left, center, or right of the display.

| | |
|-----------------------|---|
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOStion LEFT CENTER RIGHT :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOStion? |
| Example | :DISP:PVT:VIEW:WIND:TRACE:X:RPOS LEFT :DISP:PVT:VIEW:WIND:TRACE:X:RPOS? |
| Preset | LEFT |
| State Saved | Saved in instrument state. |
| Range | Left Ctr Right |
| Initial S/W Revision | A.10.01 |

Auto Scaling(Burst View)

Allows you to toggle the X Auto Scale function between On and Off.

| | |
|-----------------------|--|
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPlE 0 1 OFF ON :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPlE? |
| Example | :DISP:PVT:VIEW:WIND:TRAC:X:COUP OFF :DISP:PVT:VIEW:WIND:TRAC:X:COUP? |
| Notes | Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values, based on the measurement results, if this parameter is set to On. When you manually set a value to either X Rel Value or X Scale/Div, X Auto Scale is automatically set to Off. |
| Couplings | See Notes |
| Preset | ON |

11 Power vs. Time Measurement
SPAN X Scale

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:PAUSE |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:RESume |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

| | |
|-----------------------|--------|
| Remote Command | :ABORt |
| Example | :ABOR |

| | |
|------------------------------|---|
| Notes | If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately, with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTInuous is OFF, then :INITiate:IMMEDIATE is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met. |
| Dependencies | For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command. |
| Status Bits/OPC dependencies | The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true. |
| Initial S/W Revision | Prior to A.02.00 |

System

See "System" on page 278

Trace/Detector

Accesses a menu that allows you to control trace settings.

NOTE

Max/Min Hold Traces will be held during the averaging cycle.

| | |
|----------------------|-----------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.03.00 |

Max Hold Trace

This key allows you to make the Max Hold Trace visible or invisible in the display..

| | |
|----------------------|--|
| Key Path | Trace/Detector |
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON OFF 1 0 :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]? |
| Example | :DISP:PVT:VIEW:WIND:TRAC:MAXH ON :DISP:PVT:VIEW:WIND:TRAC:MAXH? |
| Couplings | While Rise & Fall view is selected, this key will be grayed out. Rise & Fall view will not support trace max/min hold. |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.03.00 |

Min Hold Trace

This key allows you to make the Min Hold Trace visible or invisible in the display.

| | |
|----------------|--|
| Key Path | Trace/Detector |
| Mode | LTETDD, LTE, LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON OFF 1 0 :DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]? |
| Example | :DISP:PVT:VIEW:WIND:TRAC:MINH ON :DISP:PVT:VIEW:WIND:TRAC:MINH? |
| Couplings | While Rise & Fall view is selected, this key will be grayed out. Rise & Fall view will not support trace max/min hold. |
| Preset | OFF |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.03.00 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See ["Trig Delay "](#) on page 350

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off"](#) on page 1255

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Relative Trigger

See ["Relative Trigger Level"](#) on page 1257

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay "](#) on page 354

Periodic Timer

See ["Periodic Timer \(Frame Trigger\) "](#) on page 1259

Period

See ["Period "](#) on page 1260

Offset

See ["Offset "](#) on page 1261

Offset Adjust (Remote Command Only)

See ["Offset Adjust \(Remote Command Only\)"](#) on page 1262

Reset Offset Display

See ["Reset Offset Display "](#) on page 1263

Sync Source

See ["Sync Source "](#) on page 1263

Off

See ["Off "](#) on page 1264

External 1

See "[External 1](#) " on page 1264

Trigger Level

See "[Trigger Level](#) " on page 1264

Trig Slope

See "[Trig Slope](#) " on page 1265

External 2

See "[External 2](#) " on page 1265

Trigger Level

See "[Trigger Level](#) " on page 1266

Trig Slope

See "[Trig Slope](#) " on page 1267

RF Burst

See "[RF Burst](#) " on page 1267

Absolute Trigger

See "[Absolute Trigger Level](#)" on page 1268

Trig Slope

See "[Trigger Slope](#) " on page 1269

Trig Delay

See "[Trig Delay](#)" on page 365

Auto/Holdoff

See "[Auto/Holdoff](#) " on page 1270

Auto Trig

See "[Auto Trig](#) " on page 1270

Trig Holdoff

See "[Trig Holdoff](#) " on page 1271

Holdoff Type

See "[Holdoff Type](#)" on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses the View menu for the current measurement. The available views are specific to the current measurement selected under the Meas key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below.

All Soft Keys in the “View/Display” menu work regardless of which result window currently has the focus.

The View/Display menu includes two View Selection keys as shown below, which allow you to select the desired view of the measurement.

| View | Name | Description |
|------|--------------------------|--|
| 1 | Burst (SCPI: ALL) | View Burst envelope, the length of burst can be determined by slot number in mode setup. |
| 2 | Rise & Fall (SCPI: BOTH) | Zooms in on the rising and falling portions of the burst being tested. |

View Selection by name

| | |
|-----------------------|--|
| Key Path | View/Display |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW[:SElect] ALL BOTH :DISPlay:PVTime:VIEW[:SElect]? |
| Example | DISP:PVT:VIEW:SEL ALL DISP:PVT:VIEW:SEL? |
| Preset | ALL |
| State Saved | Saved in instrument state. |
| Range | Burst Rise & Fall |
| Initial S/W Revision | A.10.01 |

| | |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:VIEW:NSElect <integer> :DISPlay:PVTime:VIEW:NSElect? |
| Example | DISP:PVT:VIEW:NSEL 2 DISP:PVT:VIEW:NSEL? |
| Notes | 1: Burst 2: Rise & Fall You must be in the WLAN mode to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |

| | |
|----------------------|---------|
| Max | 2 |
| Initial S/W Revision | A.10.01 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

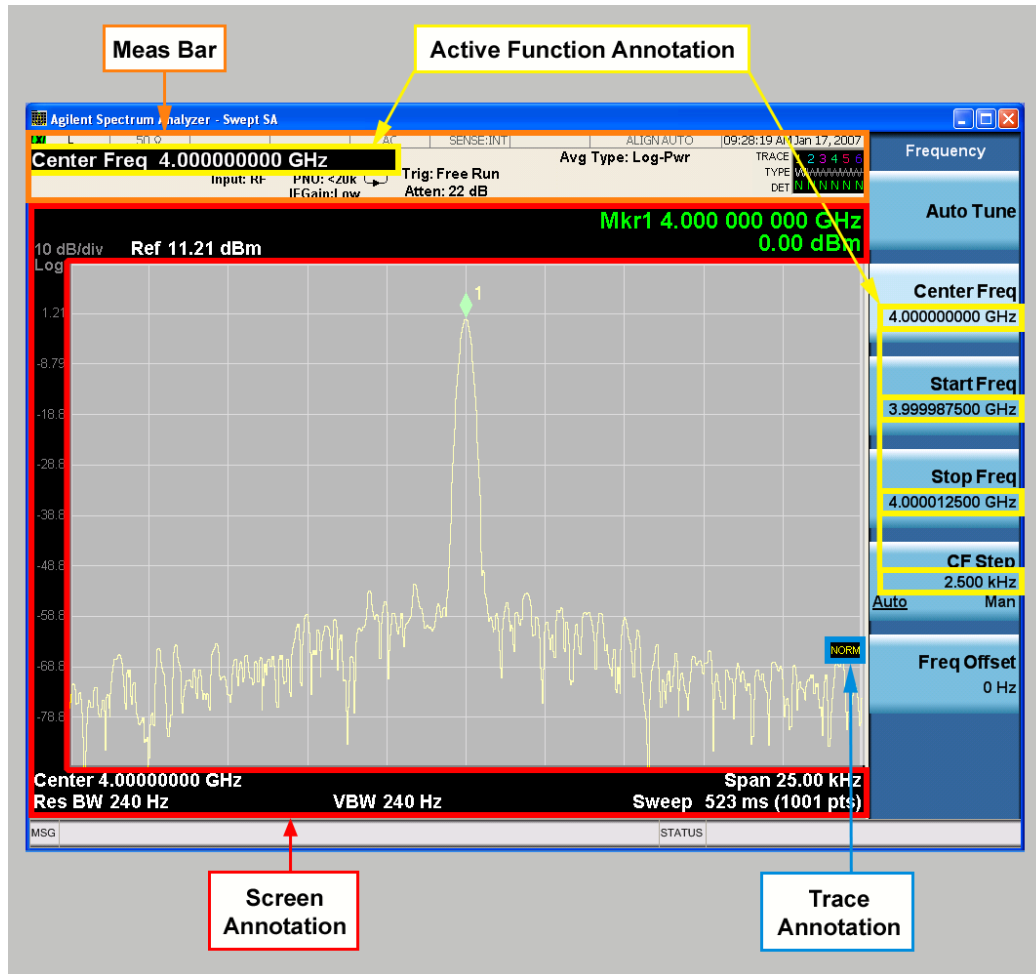
Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.

11 Power vs. Time Measurement
View/Display



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

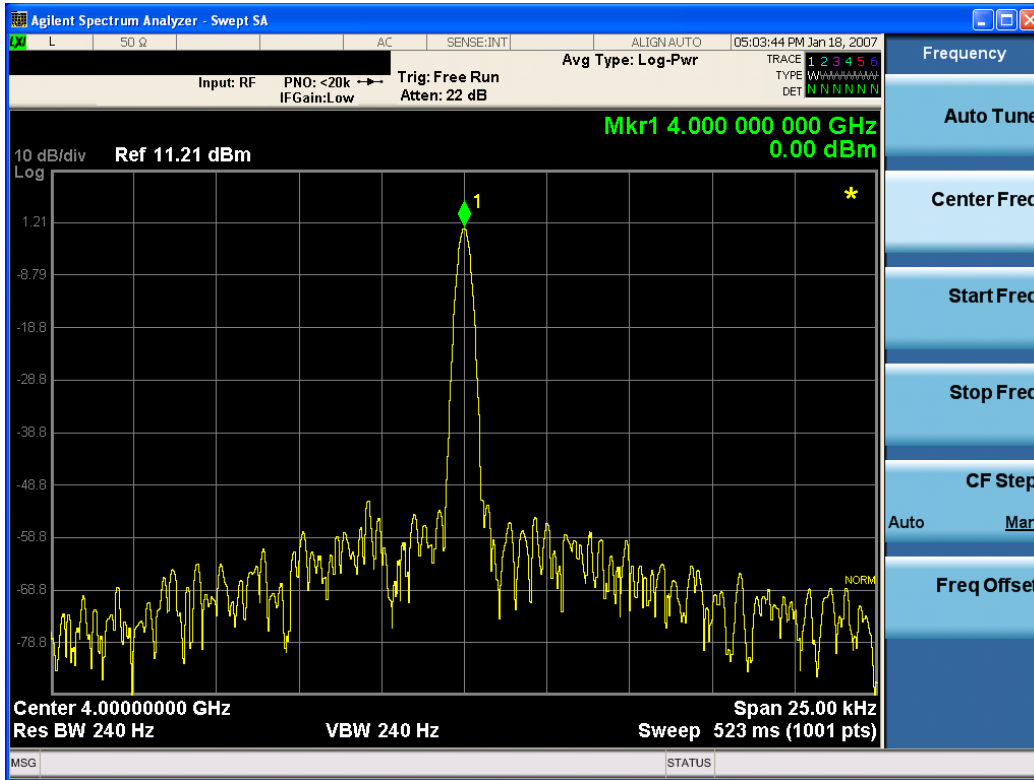
| Key Path | View/Display, Display, Annotation |
|-----------------------|--|
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

11 Power vs. Time Measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|-----------------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|-----------------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

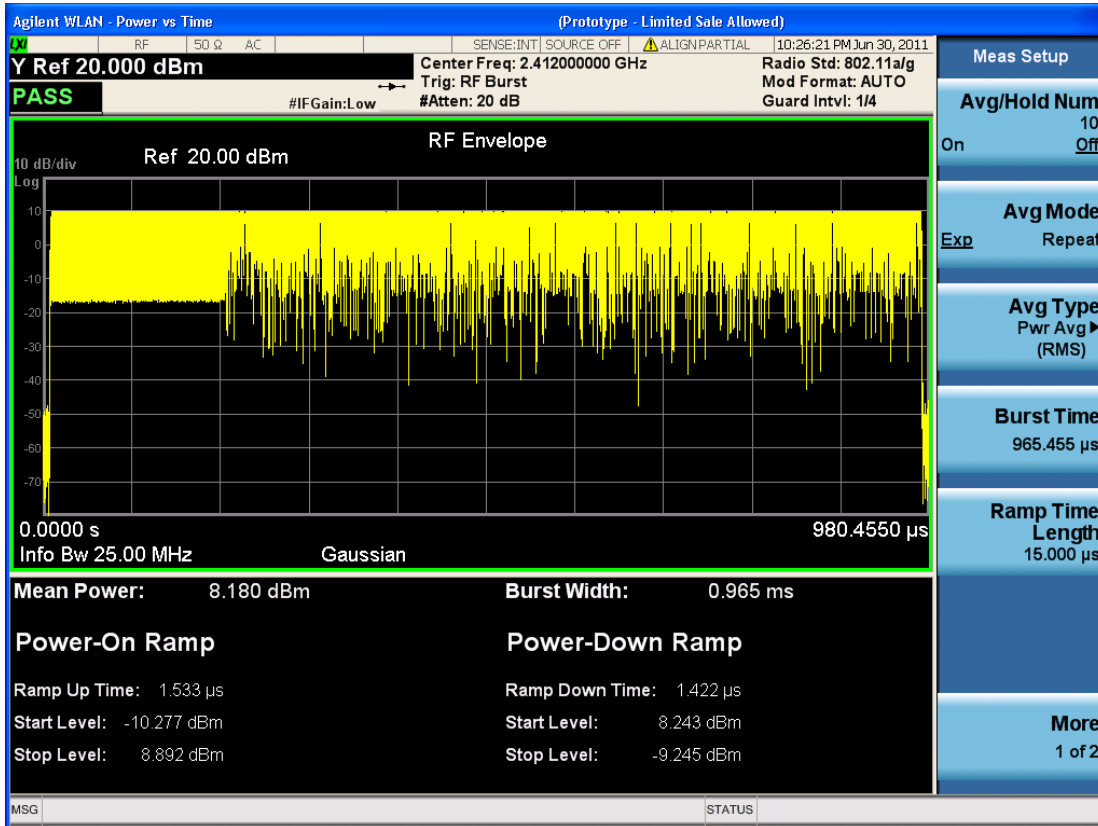
| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Burst View

This view shows power vs. time for a WLAN modulated burst. The view has two windows:

- "RF Envelope window" on page 1563(upper)
- "Result Metrics window" on page 1563(lower)

The figure below shows an example of the Burst View.



RF Envelope window

This table illustrates the details of RF envelope window:

| | |
|---------------------|---|
| Marker Operation | Yes |
| Corresponding Trace | Yellow: Signal wave form, n=2, 3, 4 Blue: Ramp up/down lines |

Result Metrics window

This table illustrates the details of metrics window:

| Name | Corresponding Results | Display Format |
|-----------------|-----------------------|----------------|
| Power-On Ramp | n=1 1st | 99.999 ms |
| Power-Down Ramp | n=1 2nd | 99.999 ms |

| Key Path | View/Display |
|----------------------|--------------|
| Initial S/W Revision | A.10.01 |

Burst Line

Turns the burst line On or Off.

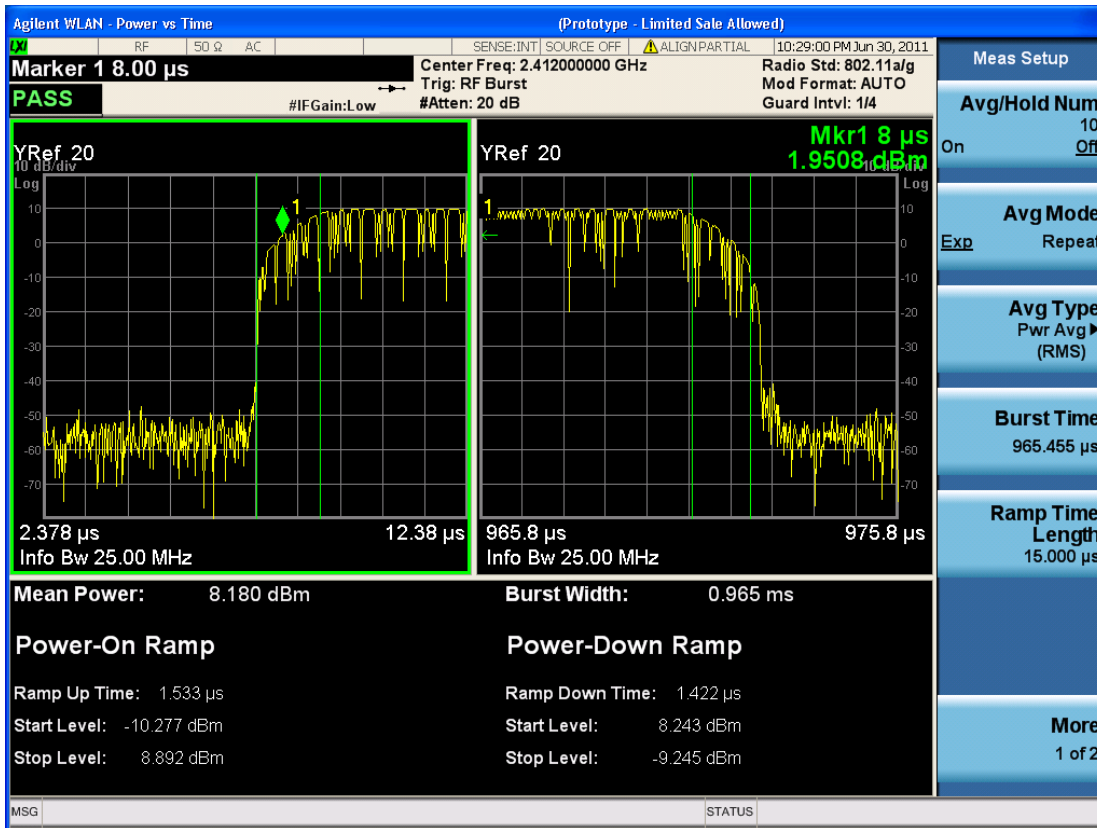
| | |
|-----------------------------|--|
| Key Path | View/Display,Burst |
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:BLINes[:STATe] OFF ON 0 1 :DISPlay:PVTime:BLIN[:STATe]? |
| Example | :DISP:PVT:BLIN ON :DISP:PVT:BLIN? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Rise & Fall View

This view has three windows:

| | |
|-----------------------------|---|
| Rising RF Envelope Window. | The parameters of this window are identical to those of the RF Envelop Window in the Burst view. |
| Falling RF Envelope Window. | The parameters of this window are identical to those of the RF Envelop Window in the Burst view. |
| Numeric Results Window. | The parameters of this window are identical to those of the Numeric Results Window in the Burst view. |

The figure below shows an example of the Rise & Fall View.



| Key Path | View/Display |
|----------------------|--------------|
| Mode | WLAN |
| Initial S/W Revision | A.10.01 |

Ramp Lines

Turns the ramp lines On or Off.

| Key Path | View/Display |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :DISPlay:PVTime:RAMP[:STATe] OFF ON 0 1 :DISPlay:PVTime:RAMP[:STATe]? |
| Example | :DISP:PVT:RAMP ON :DISP:PVT:RAMP? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

12 Spectral Flatness Measurement

Variation in carrier flatness of OFDM signals in IEEE 802.11a/g/n will reduce demodulation margins and degrade link performance. The spectral flatness measurement applies to test carrier flatness of OFDM signals in IEEE 802.11a/g and 802.11n Draft Version 11.

This topic contains the following sections:

["Measurement Commands for Spectral Flatness Measurement" on page 1568](#)

["Remote Command Results for Spectral Flatness Measurement" on page 1569](#)

Measurement Commands for Spectral Flatness Measurement

The following commands are used to retrieve the measurement results:

`:CONFigure:FLATness`

`:INITiate:FLATness`

`:FETCh:FLATness [n] ?`

`:READ:FLATness [n] ?`

`:MEASure:FLATness [n] ?`

Remote Command Results for Spectral Flatness Measurement

The following table displays the returned results from the (FETCh|MEASure|READ):FLAT commands, indexed by subopcode:

| | |
|--|---|
| non_ parameter_ table_ 11.93215 | 69.51885 |
| n | Results Returned |
| 0 | Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| not specified or n = 1 | <p>Returns comma-separated scalar results, in the following order:</p> <ol style="list-style-type: none"> 1. Return maximum peak energy deviation within all active sub-carriers. Different standard has different number of sub-carriers. Please refer to section 2.2, Measurement Algorithm. 2. Return PASS/FAIL (1:Fail, 0: Pass) 3. Return signal format; <ol style="list-style-type: none"> 0: 802.11a/g; 1: 802.11n 20MHz Non-HT 2: 802.11n 20MHz HT-greenfield 3: 802.11n 20MHz HT-Mixed 4: 802.11n 40MHz Non-HT Duplicate 5: 802.11n 40MHz HT-greenfield 6: 802.11n 40MHz HT-Mixed 7: 802.11n 40MHz MCS32 8. 802.11ac 20MHz 9. 802.11ac 40MHz VHT 10. 802.11ac 40MHz Non-HT Duplicate 11. 802.11ac 80MHz VHT 12. 802.11ac 80MHz Non-HT Duplicate 13. 802.11ac 160MHz 14. 802.11ac 160MHz Non-HT Duplicate 15. 802.11ah 1MHz (Normal Mode) 16. 802.11ah 2MHz (Normal Mode) 17. 802.11ah 2MHz (1 MHz Duplicate Mode) 18. 802.11ah 4MHz (Normal Mode) 19. 802.11ah 4MHz (1 MHz Duplicate Mode) 20. 802.11ah 4MHz (2MHz Duplicate Mode) 21. 802.11ah 8MHz (Normal Mode) 22. 802.11ah 8MHz (1 MHz Duplicate Mode) 23. 802.11ah 8MHz (2MHz Duplicate Mode) 24. 802.11ah 16MHz (Normal Mode) 25. 802.11ah 16MHz (1 MHz Duplicate Mode) |

| 26. 802.11ah 16MHz (2MHz Duplicate Mode) | |
|--|--|
| 2 | Return float values which stand for the energy deviations of each spectral lines. The exact number of values refers to section 2.2, Measurement Algorithm. |
| 3 | Return Spectral Flatness results of each section – summary data for spectral flatness results of each section: <ol style="list-style-type: none"> 1. Max Subcarrier Flatness Value (dB) in section 1 – a floating point number in dB. 2. Max Subcarrier Flatness Value to Upper Limit 1 (dB) – a floating point number in dB. 3. Max Subcarrier Flatness Index for section 1 – an integer number 4. Min Subcarrier Flatness Value (dB) in section 1 – a floating point number in dB. 5. Min Subcarrier Flatness Value to Lower Limit 1 (dB) – a floating point number in dB. 6. Min Subcarrier Flatness Index for section 1 – an integer number 7. Max Subcarrier Flatness Value (dB) in section 2 – a floating point number in dB. 8. Max Subcarrier Flatness Value to Upper Limit 2 (dB) – a floating point number in dB. 9. Max Subcarrier Flatness Index for section 2 – an integer number 10. Min Subcarrier Flatness Value (dB) in section 2 – a floating point number in dB. 11. Min Subcarrier Flatness Value to Lower Limit 2 (dB) – a floating point number in dB. 12. Min Subcarrier Flatness Index for section 2 – an integer number |

This key selects the Spectral Flatness measurement.

| | |
|--------------------------|-----------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas |
| Mode | WLAN |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45700 |

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front Panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45701 |

Ref Value

Sets the relative power reference.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RLEVel <rel_amp1> :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RLEVel? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:Y:RLEV 5db DISP:FLAT:VIEW:WIND:TRAC:Y:RLEV? |
| Couplings | When Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling is automatically set to Off. |
| Preset | 4.0 |
| State Saved | Saved in instrument state. |
| Min | -20.0 |
| Max | 20.0 |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45702 |

Range

The Range menu allows setting amplitude controls of the instrument.

| | |
|----------------------|----------------------|
| Key Path | AMPTD Y Scale |
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|-----------------------|---|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|--|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined</code> |

| | |
|--------------------------|---|
| | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation ?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio ?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|----------------|---|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real></code> |

| | |
|----------------------|--|
| | <code>[:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet ?</code> |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div

Allows you to enter a numeric value to change vertical display sensitivity.

| | |
|----------------------------|--|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | <code>:DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl></code> <code>:DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?</code> |
| Example | DISP:FLAT:VIEW:WIND:TRAC:Y:PDIV 10dB DISP:FLAT:VIEW:WIND:TRAC:Y:PDIV? |
| Couplings | When the Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling is automatically set to Off. |
| Preset | 1.0 dB |
| State Saved | Saved in instrument state. |
| Min | 0.1 dB |
| Max | 5.0 dB |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45703 |

Ref Position

Allows you to set the display reference position to the top, center, or bottom of the display.

| | |
|----------------------------|----------------------|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Mode | WLAN |

| | |
|-----------------------|---|
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTER BOTTom :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:FLAT:VIEW:WIND:TRAC:Y:RPOS? |
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45704 |

Auto Scaling

Allows you to toggle the Y axis Auto Scaling function between On and Off.

| | |
|----------------------------------|---|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:Y:COUP 0 DISP:FLAT:VIEW:WIND:TRAC:Y:COUP? |
| Couplings | When Auto Scaling is On and you press the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you manually set a value for the Rel Value or Scale/Div, this parameter is automatically set to Off. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45705 |

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, Attenuation@3003 for more information.

| | |
|--------------------------|----------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 0 |

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, Internal Preamp@3036 for more information.

| | |
|--------------------------|----------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | AMPTD Y Scale |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 0 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 1577

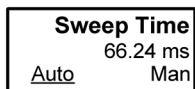
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPle ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.

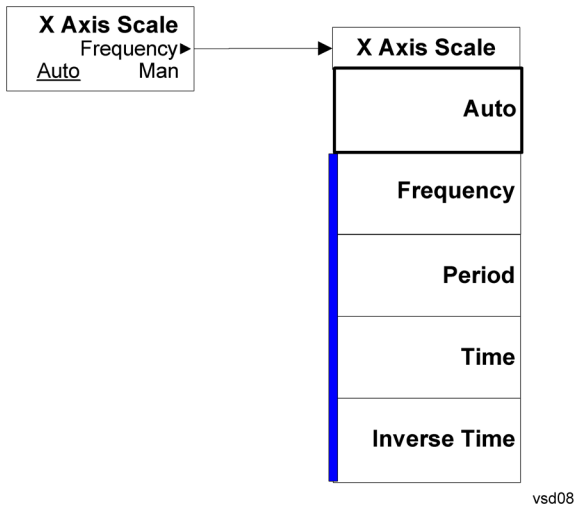


vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.

12 Spectral Flatness Measurement
Auto Couple



BW

Accesses a menu that allows you to control bandwidth settings.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45706 |

Info BW

Sets the information bandwidth This is the bandwidth used for the power measurement. The optimal setting occurs when the bandwidth is wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise, which reduces dynamic range and diminishes the accuracy of low level measurements.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | BW |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :FLATness :BANDwidth [:RESolution] <bandwidth></code> <code>[:SENSe] :FLATness :BANDwidth [:RESolution] ?</code> |
| Example | FLAT:BAND 1 kHz FLAT:BAND? |
| Dependencies | Default and Max Value are coupled with Hardware and Radio Std |
| Couplings | Info BW is coupled with subcarrier spacing value. |
| Preset | if Radio Std is 802.11 a/b/g: 25MHz if Radio Std is 802.11 n 20MHz : 25MHz if Radio Std is 802.11 n 40MHz : 40MHz if Radio Std is 802.11 ac 20MHz : 25MHz if Radio Std is 802.11 ac 40MHz : 40MHz if Radio Std is 802.11 ac 80MHz : 80MHz if Radio Std is 802.11 ac 160MHz : 160MHz if Radio Std is 802.11 ah-1MHz : 3MHz if Radio Std is 802.11 ah-2M : 3MHz if Radio Std is 802.11 ah-4M : 4MHz if Radio Std is 802.11 ah-8M : 8MHz if Radio Std is 802.11 ah-16M: 16MHz if Radio Std is 802.11 j/p-10M: 10MHz if Radio Std is 802.11 p-5M: 5MHz |
| State Saved | Saved in instrument state. |
| Min | 1 kHz |

| | |
|-------------------------------------|---|
| Max | Hardware Dependent: B25 = 25 MHz WB (40 MHz or wider) = Hardware Option Limit |
| Backwards Compatibility SCPI | [:SENSe] :FLATness :IFBW |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45707 |

Filter Type

Allows you to select a Gaussian or a Flattop filter. A Flattop is recommended in this measurement because Flattop will bring the less flatness distortion than Gaussian.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | BW |
| Mode | WLAN |
| Remote Command | [:SENSe] :FLATness :BANDwidth :TYPE GAUSSian FLATtop [:SENSe] :FLATness :BANDwidth :TYPE? |
| Example | FLAT:BAND:TYPE GAUS FLAT:BAND:TYPE? |
| Notes | This selects either a Gaussian or Flat (Flattop) filter. Gaussian is the better choice when looking at the overall burst, or rising and falling edges, because it has excellent pulse response. For most Time vs. Power measurements, the user is not mainly interested in trading off time domain accuracy vs. noise, but is more interested in total power accuracy vs. noise. If you want to want to examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. –FLATtop – a filter with a flat amplitude response, that provides the best amplitude accuracy. –GAUSSian – a filter with Gaussian characteristics, that provides the best pulse response. |
| Preset | FLATtop |
| State Saved | Saved in instrument state. |
| Range | Gaussian Flattop |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45708 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

12 Spectral Flatness Measurement
Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1587](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1589](#)

See ["Center Frequency Presets" on page 1585](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 1585 and "RF Center Freq" on page 1587 and Ext Mix Center Freq and "I/Q Center Freq" on page 1589. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1585 and "RF Center Freq" on page 1587 and "I/Q Center Freq" on page 1589. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1585 and "RF Center Freq" on page 1587 and "I/Q Center Freq" on page 1589. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

12 Spectral Flatness Measurement
 FREQ Channel

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:RF:CENTer <freq> [:SENSe] :FREQuency:RF:CENTer? |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENt 60 GHz</code> <code>:FREQ:EMIX:CENt?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table ($\text{Span} = \text{Stop Freq} - \text{Start Freq}$), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|-----------------------|---|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP [:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | <p>FREQ:CENT:STEP:AUTO ON</p> <p>FREQ:CENT:STEP 500 MHz</p> <p>FREQ:CENT UP increases the current center frequency value by 500 MHz</p> <p>FREQ:CENT:STEP?</p> <p>FREQ:CENT:STEP:AUTO?</p> |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | <p>Span, RBW, Center frequency</p> <p>If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning.</p> |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | <p>Auto</p> <p>ADEM0D: 1 MHz</p> <p>ON</p> |
| State Saved | Saved in instrument state |
| Min | – (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Input/Output

See "Input/Output" on page 162

Marker

Accesses the menu that allow you to select, set up, and control the markers for the current measurement.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45709 |

Select Marker

Displays 12 markers available for selection.

| | |
|--------------------------|-----------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45710 |

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, Marker X axis value of the selected marker appears on the Active Function area.

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:MODE POSITION DELTa OFF :CALCulate:FLATness:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:FLAT:MARK:MODE POS CALC:FLAT:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: The active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: The marker X axis value for flatness graph |

| | |
|----------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta Off |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45711 |

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker, Properties |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:FLATness:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:FLAT:MARK:REF 3 CALC:FLAT:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried, a single value is returned (the specified marker number's relative marker). |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 12 |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45715 |

Select Marker

Displays 12 markers available for selection.

| | |
|--------------------------|-----------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45710 |

Relative To

Sets the reference marker to which the selected marker is relative.

| | |
|--------------------------|--|
| Key Path | Marker, Properties |
| Mode | SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, WLAN, MSR, LTEAFDD, LTEATDD |
| Remote Command | :CALCulate:CHPower:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:CHPower:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:CHP:MARK:REF 5 CALC:CHP:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried, a single value is returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis or WCDMA mode to use this command. Use :INSTRument:SElect to set the mode. |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 12 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.02.00, A.03.00 |

Marker Trace

Assigns the specified marker to the designated trace.

| | |
|------------------------------|--|
| parameter_table_ 24.18339 | 54.41263 |
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:TRACe FLATness ULIMit LLIMit :CALCulate:FLATness:MARKer[1] 2 ... 12:TRACe? |
| Example | CALC:FLAT:MARK2:TRAC FLAT CALC:FLAT:MARK:TRAC? |
| Preset | Flatness Trace |
| State Saved | Saved in instrument state. |
| Range | Flatness Trace Upper Limit Lower Limit |

| | |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45716 |

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an “equal X Axis movement” of every other marker which is active. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going offscreen.

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:FLATness:MARKer:COUPle[:STATe]? |
| Example | CALC:FLAT:MARK:COUP ON CALC:FLAT:MARK:COUP? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45717 |

All Markers Off

Turns off all markers.

| | |
|--------------------------|---------------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer:AOFF |
| Example | CALC:FLAT:MARK:AOFF |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45718 |

Marker X Axis Value

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

| | |
|------------------------------|--|
| parameter_table_ 24.18339 | 54.41263 |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:X <real> :CALCulate:FLATness:MARKer[1] 2 ... 12:X? |
| Example | CALC:FLAT:MARK3:X 0 CALC:FLAT:MARK3:X? |
| Preset | After a preset, all markers are set to Off, so a Marker X Axis Value query will return a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37. |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45712 |

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** - except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

| | |
|----------------------------------|--|
| parameter_ table_ 24.18339 | 54.41263 |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:X:POSition <real> :CALCulate:FLATness:MARKer[1] 2 ... 12:X:POSition? |
| Example | CALC:FLAT:MARK10:X:POS 10 CALC:FLAT:MARK10:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points, if the control mode is Delta . The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is Off the response is not a number(NAN). |
| Preset | After a preset, all markers are set to Off, so Marker X Axis Position query will return a not a number (NAN). |
| State Saved | No |
| Min | -9.9E+37 |
| Max | 9.9E+37 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |
| Help Map ID | 0 |

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:Y? |
| Example | CALC:FLAT:MARK11:Y? |
| Preset | Result dependant on Markers setup and signal source |
| State Saved | No |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 0 |

Marker Function

There are no 'Marker Functions' supported in this measurement, so this front-panel key displays a blank menu when pressed.

| | |
|--------------------------|--------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front Panel |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45719 |

Marker To

There is no 'Marker To' functionality supported in this measurement, so this front-panel key displays a blank key menu when pressed.

| | |
|--------------------------|--------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front Panel |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45720 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 2431](#)

["Current Measurement Query \(Remote Command Only\)" on page 2433](#)

["Limit Test Current Results \(Remote Command Only\)" on page 2433](#)

["Data Query \(Remote Command Only\)" on page 2433](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 2434](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 2439](#)

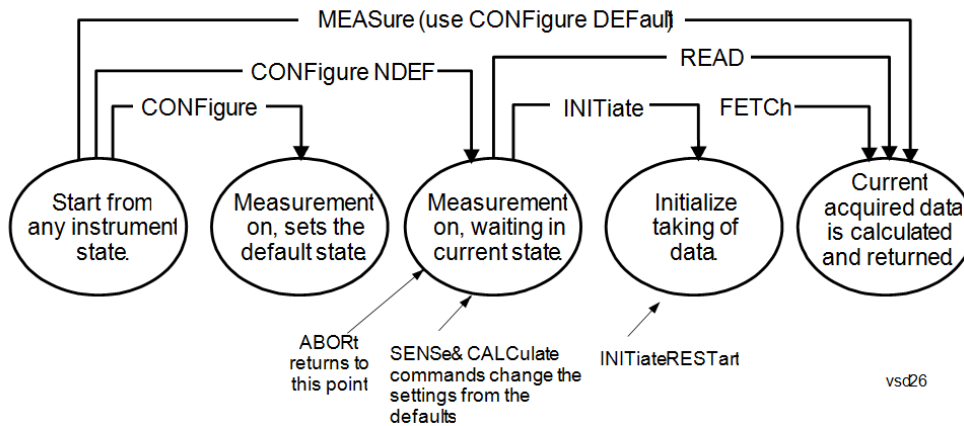
["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 2440](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 2454](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 2455](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ($n=0$) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

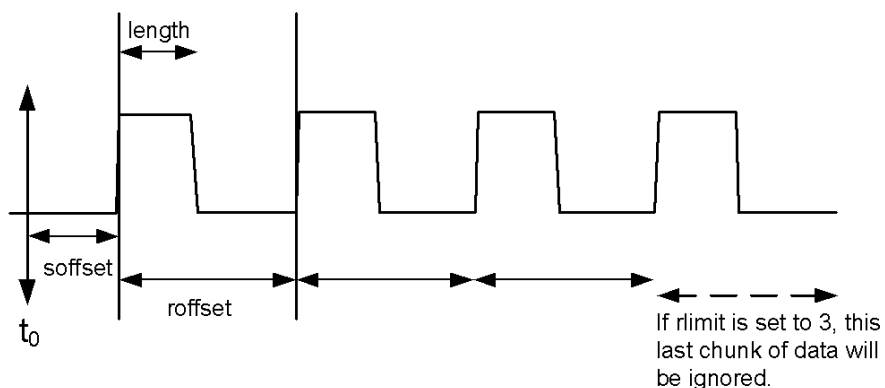
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

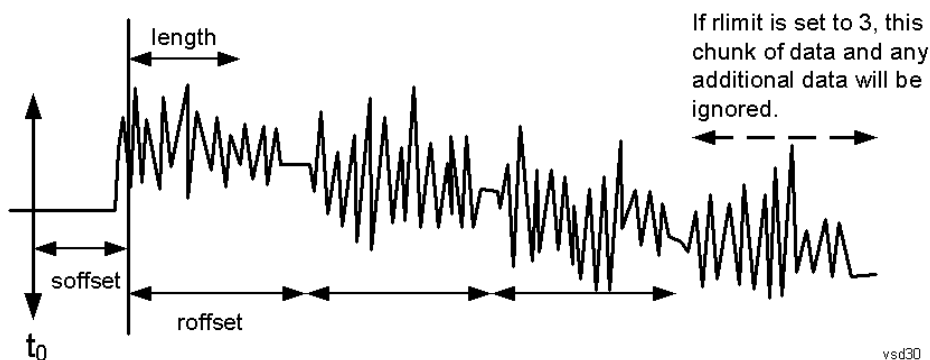
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|---|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLline LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
|-----------------------|---|

| | |
|----------------|---|
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
|----------------|---|

| | |
|--------------|---|
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|-------------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

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| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M All
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R :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?

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E :CALC:FPOW:POW1:DEF?

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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWer[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMal SWAPped :FORMat:BORDER? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Accesses the measurement setup menu for the current measurement.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45721 |

Avg Number

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action.

- On - Sets measurement averaging on.
- Off - Sets measurement averaging off.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe]:FLATness:AVERage:COUNT <integer> [:SENSe]:FLATness:AVERage:COUNT? [:SENSe]:FLATness:AVERage[:STATe] OFF ON 0 1 [:SENSe]:FLATness:AVERage[:STATe]? |
| Example | FLAT:AVER:COUN 1 FLAT:AVER:COUN? FLAT:AVER OFF FLAT:AVER? |
| Preset | 10 OFF |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45722 |

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

| | |
|-------------------------------------|--|
| non_parameter_table_20.27878 | 58.19128 |
| KEY:Exponential SCPI:EXPonential | After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average. |
| KEY:Repeat SCPI:REPeat | After reaching the average count, the averaging is reset and a new average is started. |

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :FLATness :AVERage :TCONtrol EXPonential REPEAT [:SENSe] :FLATness :AVERage :TCONtrol ? |
| Example | FLAT:AVER:TCON REP FLAT:AVER:TCON? |
| Preset | REPeat |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45723 |

Search Length

Enables you to specify the Search Length for WLAN spectral flatness measurement. Please note, this parameter determines the length of data to be acquired. In order to assure channel estimation, preamble should be included in, therefore Search Length should not be less than summation of long preamble, short preamble and payload, or actual data.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :FLATness :SLENgth <time> [:SENSe] :FLATness :SLENgth ? |
| Example | FLAT:SLEN 1ms FLAT:SLEN? |
| Preset | 500us |
| State Saved | Saved in instrument state. |
| Min | 28.0 us |
| Max | Hardware Dependent: |

| | |
|-------------------------------------|---|
| | 4000000 / Sampling Rate B25: Sampling Rate = 45M (when info BW is 25MHz); WB (B40 or Wider): Sampling Rate = Info BW * 1.25 |
| Backwards Compatibility SCPI | [:SENSe] :FLATness:TIME:SEARChlen <time> |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45724 |

Limits

Accesses the Format/Limits menu, which contains features that enable you to do limit check.

For IEEE 802.11a/g-ERP-OFDM/g-DSSS-OFDM specification, Section 1 includes the carriers -16...-1 and 1...16, Section 2 includes -26...-17 and 17... 26.

For IEEE 802.11n, 20MHz specification, Section 1 includes the carriers -16...-1 and 1...16, Section 2 includes -28...-17 and 17... 28.

For IEEE 802.11n, 40MHz transmission specification (excluding HT duplicate and Non-HT Duplicate), Section 1 includes the carriers -42...-2 and 2...42, while Section 2 includes -58...-43 and 43... 58.

For IEEE 802.11n, 40MHz Duplicate mode (including HT and Non-HT duplicate) , Section 1 includes the carriers -42 to -33, -31 to -6, +6 to +31, and +33 to +42, while Section 2 includes -58...-43 and 43... 58.

For IEEE 802.11ac, 20MHz specification, Section 1 includes the carriers -16...-1 and 1...16, Section 2 includes -28...-17 and 17... 28.

For IEEE 802.11ac, 40MHz transmission specification , Section 1 includes the carriers -42...-2 and 2...42, while Section 2 includes -58...-43 and 43... 58.

For IEEE 802.11n, 40MHz Non-HT duplicate mode , Section 1 includes the carriers -42 to -33, -31 to -6, +6 to +31, and +33 to +42, while Section 2 includes -58...-43 and 43... 58.

For IEEE 802.11ac, 80MHz transmission specification , Section 1 includes the carriers -84...-2 and 2...84, while Section 2 includes -122...-85 and 85... 122.

For IEEE 802.11n, 80MHz Non-HT duplicate mode , Section 1 includes the carriers -84 to -70, -58 to -33, -31 to -6, +6 to +31, and +33 to +58, +70 to +84, while Section 2 includes -122...-97, -95 to -85and +85... +95, +97 to +122.

For IEEE 802.11ac, 160MHz transmission specification , there is only one Section which includes the carriers -250...-6 and 6...250.

For IEEE802.11ah 1MHz, Section 1 includes the carriers -8...-1 and 1...8, Section 2 includes -13...-9 and 9... 13.

For IEEE802.11ah 2MHz normal mode, Section 1 includes the carriers -16...-1 and 1...16, Section 2 includes -28...-17 and 17... 28.

For IEEE802.11ah 2MHz 1MHz duplicate mode, Section 1 includes the carriers -15...-3 and 3...15, Section 2 includes -29...-17 and 17... 29.

For IEEE802.11ah4MHz normal mode, Section 1 includes the carriers -42...-2 and 2...42, while Section 2 includes -58...-43 and 43... 58.

For IEEE802.11ah4MHz 1MHz duplicate mode, Section 1 includes the carriers -42...-35, -29 to -17, -15 to -3 and 3 to 15, 17 to 29, 35...42, while Section 2 includes -61...-49, -47 to -43 and 43... 47, 49 to 61.

For IEEE802.11ah4MHz 2MHz duplicate mode, Section 1 includes the carriers -42 to -33, -31 to -6, +6 to +31, and +33 to +42, while Section 2 includes -58...-43 and 43... 58.

For IEEE802.11ah 8MHz normal mode, Section 1 includes the carriers -84...-2 and 2...84, while Section 2 includes -122...-85 and 85... 122.

For IEEE802.11ah 8MHz 1MHz duplicate mode, Section 1 includes the carriers -84...-81, -79 to -67, -61 to -49, -47 to -35, -29 to -17, -15 to -3, and 3 to 15, 17 to 29, 35 to 47, 49 to 61, 67 to 79, 81 to 84, while Section 2 includes -125 to -113, -111 to -99, -93 to -85 and 85 to 93, 99 to 111, and 113 to 125.

For IEEE802.11ah8MHz 2MHz duplicate mode, Section 1 includes the carriers -84 to -70, -58 to -33, -31 to -6, +6 to +31, and +33 to +58, +70 to +84, while Section 2 includes -122...-97, -95 to -85 and +85... +95, +97 to +122.

For IEEE802.11ah16MHz 1MHz duplicate mode, there is only one Section which includes the carriers -253...-6 and 6...253.

For IEEE802.11ah16MHz 2MHz duplicate mode or S1G mode, there is only one Section which includes the carriers -250...-6 and 6...250.

To be compatible with PSA existing commands, the X-Series WLAN Spectral Flatness measurement also provides the BWCC commands to configure the limit parameters, those commands will accept array parameters rather than single one, and the default values will be kept the same.

| | |
|--------------------------|-------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45733 |

Upper Limit Section 1

This parameter allows you to specify upper deviation limit (dB) of the Section 1

| | |
|----------------------------|---|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | Meas Setup, Limit |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:LIMit:UPPer:SECTion1 <rel_amp> :CALCulate:FLATness:LIMit:UPPer:SECTion1? |
| Example | CALC:FLAT:LIM:UPP:SECT1 2.0 CALC:FLAT:LIM:UPP:SECT1? |

| | |
|-------------------------------------|---|
| Notes | The BWCC commands will set All upper limit once, including Segment 1 (Section 1) and Segment 2 (Section 2). If there is only one input parameter, Segment 1 upper limit will be set; if more than 2 input parameters, only the first 2 will be uses as Segment 1 and 2 upper limit. |
| Preset | 4.00 |
| State Saved | Saved in instrument state. |
| Min | 0.10 |
| Max | 10.00 |
| Backwards Compatibility SCPI | :CALCulate:FLATness:SEGment:LIST:LIMit:UPPer <rel_ampl>, <rel_ampl> :CALCulate:FLATness:SEGment:LIST:LIMit:UPPer? |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45734 |

Lower Limit Section 1

This parameter allows you to specify lower deviation limit (dB) of the Section 1.

| | |
|-------------------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup, Limit |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:LIMit:LOWer:SECTion1 <rel_amp> :CALCulate:FLATness:LIMit:LOWer:SECTion1? |
| Example | CALC:FLAT:LIM:LOW:SECT1 -2.0 CALC:FLAT:LIM:LOW:SECT1? |
| Notes | The BWCC commands will set All lower limit once, including Segment 1 (Section 1) and Segment 2 (Section 2). If there is only one input parameter, Segment 1 lower limit will be set; if more than 2 input parameters, only the first 2 will be uses as Segment 1 and 2 lower limit. |
| Preset | -4.00 -6.00 for 802.11ac 160MHz |
| State Saved | Saved in instrument state. |
| Min | -10.00 |
| Max | -0.10 |
| Backwards Compatibility SCPI | :CALCulate:FLATness:SEGment:LIST:LIMit:LOWer <rel_ampl>, <rel_ampl> :CALCulate:FLATness:SEGment:LIST:LIMit:LOWer? |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45735 |

Upper Limit Section 2

This parameter allows you to specify upper deviation limit (dB) of the Section 2.

| | |
|-------------------------------------|---|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | Meas Setup, Limit |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:LIMit:UPPer:SECTion2 <rel_amp> :CALCulate:FLATness:LIMit:UPPer:SECTion2? |
| Example | CALC:FLAT:LIM:UPP:SECT2 2.0 CALC:FLAT:LIM:UPP:SECT2? |
| Notes | The BWCC commands will set All upper limit once, including Segment 1 (Section 1) and Segment 2 (Section 2). If there is only one input parameter, Segment 1 upper limit will be set; if more than 2 input parameters, only the first 2 will be uses as Segment 1 and 2 upper limit. |
| Preset | 4.00 |
| State Saved | Saved in instrument state. |
| Min | 0.10 |
| Max | 10.00 |
| Backwards Compatibility SCPI | :CALCulate:FLATness:SEGment:LIST:LIMit:UPPer <rel_amp>, <rel_amp> :CALCulate:FLATness:SEGment:LIST:LIMit:UPPer? |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45736 |

Lower Limit Section 2

This parameter allows you to specify lower deviation limit (dB) of the Section 2.

| | |
|----------------------------------|---|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | Meas Setup, Limit |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:LIMit:LOWer:SECTion2 <rel_amp> :CALCulate:FLATness:LIMit:LOWer:SECTion2? |
| Example | CALC:FLAT:LIM:LOW:SECT2 -2.0 CALC:FLAT:LIM:LOW:SECT2? |
| Notes | The BWCC commands will set All lower limit once, including Segment 1 (Section 1) and Segment 2 (Section 2). |

| | |
|-------------------------------------|---|
| | 2). If there is only one input parameter, Segment 1 lower limit will be set; if more than 2 input parameters, only the first 2 will be uses as Segment 1 and 2 lower limit. |
| Preset | -6.00 |
| State Saved | Saved in instrument state. |
| Min | -10.00 |
| Max | -0.10 |
| Backwards Compatibility SCPI | :CALCulate:FLATness:SEGment:LIST:LIMit:LOWer <rel_ampl>, <rel_ampl> :CALCulate:FLATness:SEGment:LIST:LIMit:LOWer? |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45737 |

Advanced

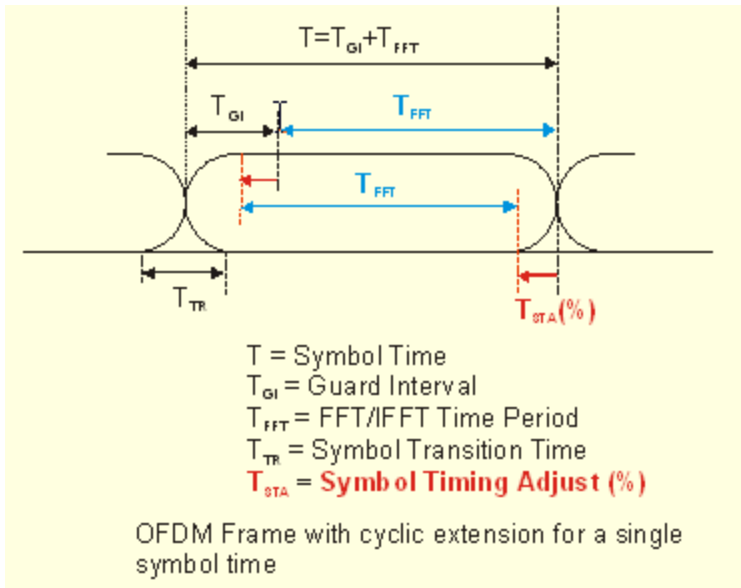
Accesses advanced measurement setup features. These features are intended for the advanced user.

| | |
|--------------------------|-------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup, More |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45726 |

Symbol Timing Adjust

Normally, when demodulating of an OFDM symbol, the guard interval is skipped over, and an FFT is performed on the last portion of the symbol time. However, this means that the FFT would include the transition region between this symbol and the following symbol. To avoid this, it is generally beneficial to back up away from the end of the symbol time, and use a part of the guard interval.

This parameterSymbol Timing Adjust controls how far the FFT part of the symbol is adjusted away from the end of the symbol time. The value is in terms of percent of the used (FFT) part of the symbol time.



| | |
|-------------------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | [:SENSe] :FLATness :TADJust <percent> [:SENSe] :FLATness :TADJust? |
| Example | FLAT:TADJ -3.125 FLAT:TADJ? |
| Couplings | The Min Value of Symbol Timing Adjust is -100.0 * Guard Interval . The value of Symbol Timing Adjust clipped to times of 1/128. (For 11 n, Bebob 's support can be clipped to 1/256, to keep simple, we use 1/128 also). |
| Preset | -3.125% |
| State Saved | Saved in instrument state. |
| Min | -100.0 * Guard Interval |
| Max | 0.0 |
| Backwards Compatibility SCPI | [:SENSe] :FLATness :TIMadj <percent> |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45730 |

Sync Training Sequence

This parameter specifies synchronization method to use when synchronizing to the start of the OFDM burst. The valid values are Short or Long. A value of Short means to search for and synchronize to an

802.11a preamble short symbol sequence.

A value of Long means to search for and synchronize to an 802.11a/g preamble long symbol sequence (also called the channel estimation sequence).

| | |
|-------------------------------------|--|
| parameter_ table_ 24.18339 | 54.41263 |
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | [:SENSe] :FLATness :STSequence LONG SHORT [:SENSe] :FLATness :STSequence? |
| Example | FLAT:STS LONG FLAT:STS? |
| Notes | Only used in 802.11a/g (OFDM), 801.11g (DSSS-OFDM) measurement, otherwise it will be grayed out. If SCPI command is sent to change this value, it generate message“-221 Setting conflict; Sync Training Sequence is not available for current Radio Setting” |
| Preset | SHORT |
| State Saved | Saved in instrument state. |
| Backwards Compatibility SCPI | [:SENSe] :FLATness :SYNCseq |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45731 |

Spectrum

Sets a spectrum to either normal or invert for demodulation related measurements. If invert is set, the upper and lower spectrums are swapped.

The invert function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or a low side mix.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:SPECTrum INVert NORMal :CALCualte:FLATness:SPECTrum? |
| Example | CALC:FLAT:SPEC INV CALC:FLAT:SPEC? |
| Preset | NORMal |

| | |
|-------------------------------------|---|
| State Saved | Saved in instrument state. |
| Range | Normal Invert |
| Backwards Compatibility SCPI | [:SENSe] :FLATness :MIRRORspec OFF ON 0 1 |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45732 |

Meas Preset

Returns parameters for the current measurement to those set by the factory.

| | |
|--------------------------|---------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | :CONFigure:FLATness |
| Example | CONF:FLAT |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45725 |

12 Spectral Flatness Measurement
Mode

Mode

See "[Mode](#)" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1638 for more information.

| | |
|--------------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPle ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODes | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPUt | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGN | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Places the selected marker on the trace point that has the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker Off causes the selected marker to be set to Normal; then a peak search is immediately performed.

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Mode | WLAN |
| Remote Command | :CALCulate:FLATness:MARKer[1] 2 ... 12:MAXimum |
| Example | CALC:FLAT:MARK:MAX |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45738 |

12 Spectral Flatness Measurement
Print

Print

See "[Print](#)" on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 1647.

| Key Path | Recall |
|----------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

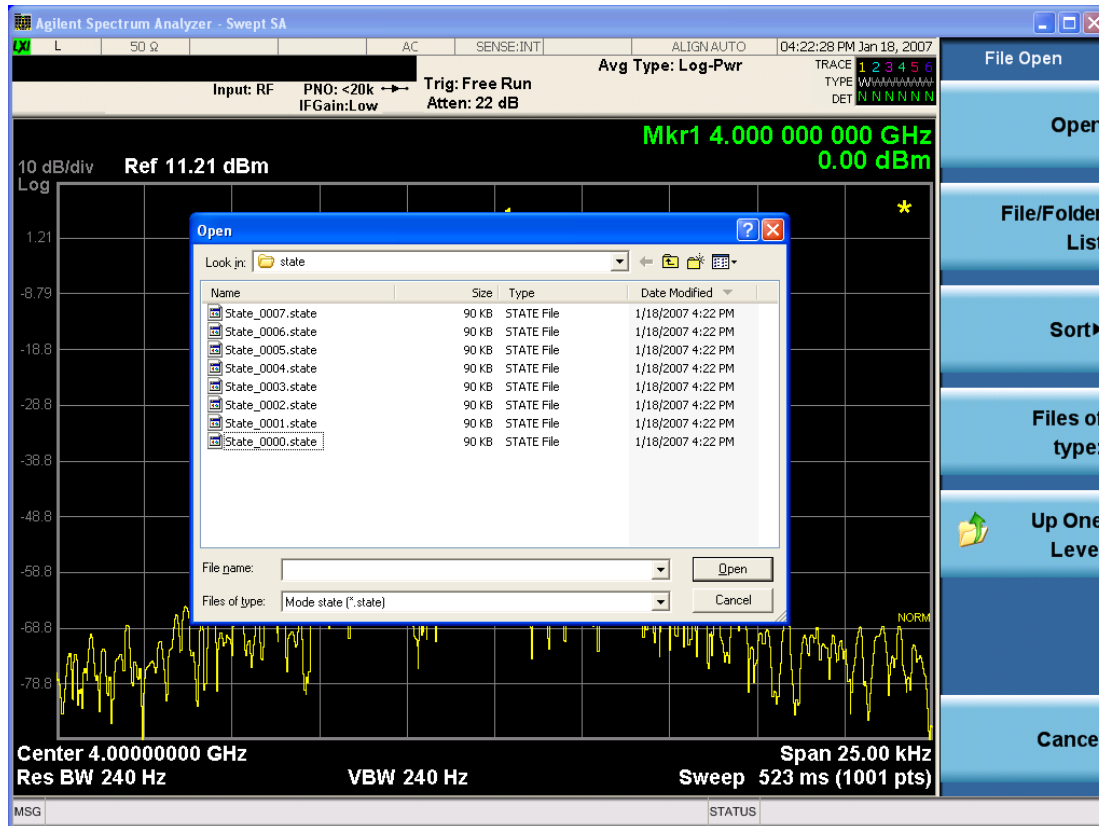
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|---------------------------------|---|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|----------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMory:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1655

| Key Path | Front-panel key |
|-------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|----------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

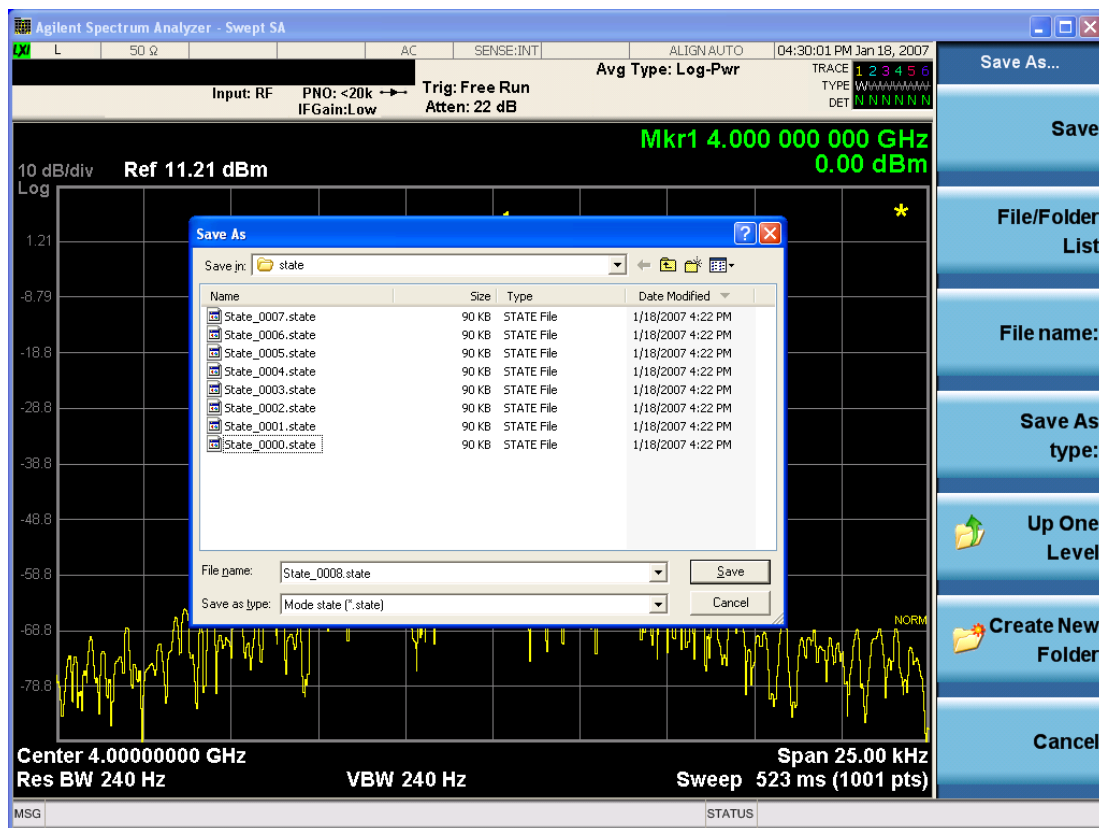
| | |
|----------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMory:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1660](#)

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|---------------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|----------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Mass Storage Remove Directory (Remote Command Only)

| | |
|----------|------------------|
| Key path | SCPI Only |
|----------|------------------|

| | |
|-----------------------|--------------------------------------|
| Remote Command | :MMEMory:RDIRectory <directory_name> |
|-----------------------|--------------------------------------|

| | |
|-------|--|
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
|-------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|----------|------------------------|
| Key Path | Save, Sequences |
|----------|------------------------|

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|-----------------------|---|
| Remote Command | :MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt" |
|-----------------------|---|

| | |
|----------------|---------------------------------------|
| Example | :MMEM:STOR:SEQ:SLISt "MySequence.txt" |
|----------------|---------------------------------------|

| | |
|-------|--|
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none"> -CSV (Comma delimited) (*.csv) -Text (Tab delimited) (*.txt) |
|-------|--|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|-----------------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|-----------------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\`<mode name>`\data\traces

For all of the Limit Data Files:

My Documents\`<mode name>`\data\limits

For all of the Measurement Results Data Files:

My Documents\`<mode name>`\data\`<measurement name>`\results

For all of the Capture Buffer Data Files:

My Documents\`<mode name>`\data\captureBuffer

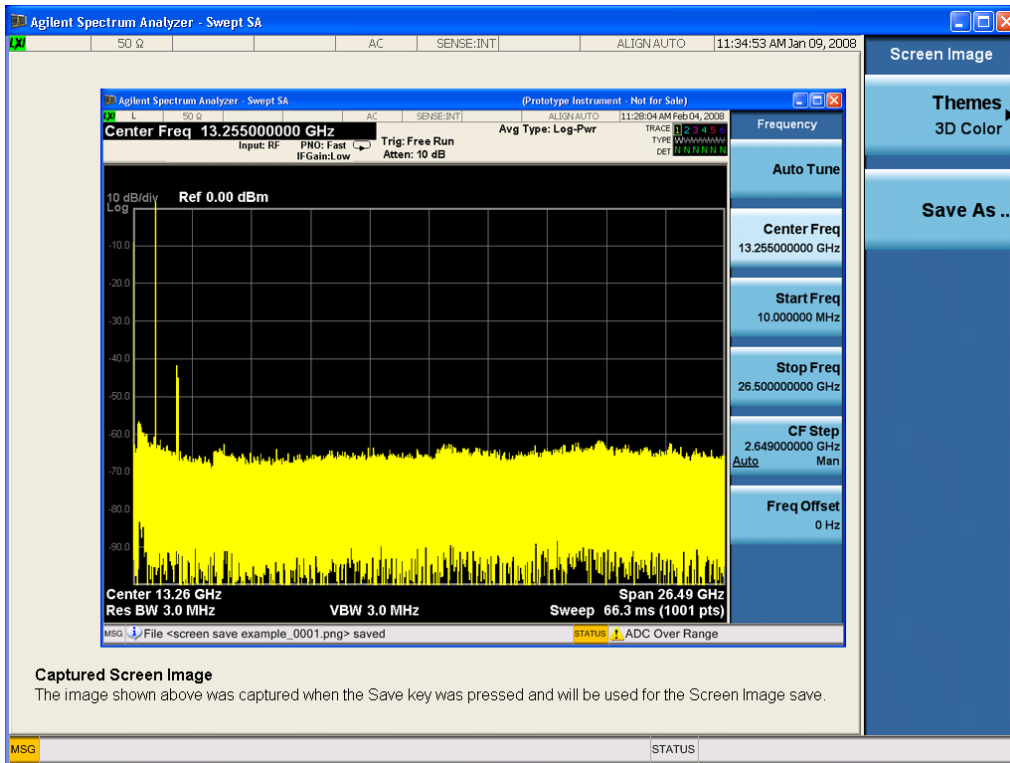
| Key Path | Save, Data |
|----------------------|---|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <code><mode specific></code> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReem:THEMe TDColor TDMonochrome FCOLor FMONochrome :MMEMory:STORe:SCReem:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 1672

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------|---|
| Remote Command | :OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|----------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1675](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1675 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1675 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| Key Path | Source, Amplitude |
|----------------------|---|
| Dependencies | This key is unavailable, and is grayed out when the " List Sequencer " on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFerence <ampl> :SOURce:POWer:REFerence? :SOURce:POWer:REFerence:STATe OFF ON 0 1 :SOURce:POWer:REFerence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on " List Sequencer " on page 2585. If the " Sequencer " on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " Sequencer " on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 1679](#),

"W-CDMA Channel Number Ranges" on page 1680, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1681, and "LTE FDD Channel Number Ranges" on page 1683.

| | |
|-----------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|--|--|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ $350 \leq n \leq 425$ | $n \div 5 + 1850.1$ $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ $1662 \leq n \leq 1862$ | $n \div 5 + 1450$ $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ $4132 \leq n \leq 4233$ | $n \div 5 + 670.1$ $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ $4162 \leq n \leq 4188$ | $n \div 5 + 670.1$ $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| Band IX | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| Band X | Downlink | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | Uplink | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| | | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| Band XI | Downlink | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Uplink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| Band XII | Downlink | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| | | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | Uplink | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIII | Downlink | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| | | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | Uplink | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIV | Downlink | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| | | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | Uplink | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| Band XIX | Downlink | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| | | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | Uplink | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 \times N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|---------------------------|--------------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | 2110 | | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | 1930 | | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | 1805 | | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | 2110 | | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | 869 | | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | 875 | | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | 2620 | | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | 925 | | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | 1844.9 | | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | 2110 | | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | 1475.9 | | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | 729 | | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | 746 | | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | 758 | | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | 734 | | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | 860 | | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 - 6149 | 830 | 24000 | 24000 - 24149 |
| 20 | 791 | 6150 | 6150 - 6449 | 832 | 24150 | 24150 - 24449 |
| 21 | 1495.9 | 6450 | 6450 - 6599 | 1447.9 | 24450 | 24450 - 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 - 8039 | 1626.5 | 25700 | 25700 - 26039 |
| 25 | 1930 | 8040 | 8040 - 8689 | 1850 | 26040 | 26040 - 26689 |
| 26 | 859 | 8690 | 8690 - 9039 | 814 | 26690 | 26690 - 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 - 36199 | 1900 | 36000 | 36000 - 36199 |
| 34 | 2010 | 36200 | 36200 - 36349 | 2010 | 36200 | 36200 - 36349 |
| 35 | 1850 | 36350 | 36350 - 36949 | 1850 | 36350 | 36350 - 36949 |
| 36 | 1930 | 36950 | 36950 - 37549 | 1930 | 36950 | 36950 - 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|------------------|
| 37 | 1910 | 37550 | 37550 -37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 -38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 -38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 -39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900–1920 MHz | 9504 to 9596 |
| | 2010–2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850–1910 MHz | 9254 to 9546 |
| | 1930–1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910–1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570–2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300–2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880–1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|-----------------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} - \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| | |
|-----------------------------|--|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| | |
|-----------------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samps, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load afile to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:LOAD:ALL <string>

Example :SOUR:RAD:ARB:LOAD:ALL "D: varb"

Notes

<string> - specifies the directory on the HDD to load the files into ARB memory from.

When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.

When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.

If you specify a directory over SCPI, but the directory does not exist, an error is generated.

If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 2540**.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|--|
| | <p><integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"</p> |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:CBWidth <freq> :SOURCE:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:BANDwidth <freq> :SOURCE:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NChannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGle SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

"Sequencer" on page 2585 and **"Sequencer" on page 2586** state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 2611**.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as **"Load Segment To ARB Memory" on page 2611**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as **"Load All To ARB Memory" on page 2612**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as **"Change Directory..." on page 2613**.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as **"Default Directory..." on page 2613**

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540](#).

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the "Save As" dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command :SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 1737](#) "For Setup SCPI".)

:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 1738](#) below.)

Example

For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes

For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
|----------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. “Left” module for E6630A or “TRX1” module for E6640A.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
|----------|--|

| | |
|--------------|---|
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
|--------------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load afile to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LiCense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LiCense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LIcense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path **Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses**

Remote Command :SYSTem:LKEY:WAVeform:LOCK <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>

Example SYST:LKEY:WAV:LOCK 1
or
SYST:LIC:WAV:LOCK 1

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command :SYSTem:LKEY:WAVeform:STATus? <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>

Example :SYST:LKEY:WAV:STAT? 1
<"Locked"
or
:SYST:LIC:WAV:STAT? 1
<"Locked"

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LICense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266" |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMorY:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEViation] :SOURce:PM[:DEViation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select "On", trigger event will occur on both Internal and External2 paths. Select "Off" will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMEDIATE INTERNAL KEY BUS EXTERNAL2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|---|---|
| R e m o t e C o m m a n d | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND? |
| E x a m p l | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND? |

| | |
|---|--|
| e | |
| N | The command is to setup below parameter array of whole list sequence. |
| O | Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591 . |
| t | If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then |
| e | generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| s | |
| R | NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI |
| e | V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO |
| m | REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 |
| o | BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1 |
| t | 9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN |
| e | D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF |
| C | |
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| m | |
| m | |
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| N | |
| o | |
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| e | |
| s | |
| D | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on |
| e | page 2587 . |
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|---|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTinuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

| | |
|----------------------|--|
| | see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount? |
| Example | :SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC? |
| Notes | The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 2616 and "Play Count" on page 2617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 2616 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #" |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ? |
| Example | :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 2618 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in |

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

SPAN X Scale

Accesses the SPAN/X Scale menu that allows you to set the desired horizontal scale settings.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45739 |

Ref Value

Allows you to set the display X reference value.

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RLEVel <real> :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RLEVel? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:X:RLEV 1 DISP:FLAT:VIEW:WIND:TRAC:X:RLEV? |
| Notes | Default value is coupled with Radio Std. |
| Couplings | If Auto Scaling is On, this value is automatically determined by the measurement result. When a value is set manually, Auto Scaling is automatically set to Off. |
| Preset | If Radio Std is 802.11 a/g-ERP-OFDM/g-DSSS-OFDM: -26 Carr If Radio Std is 802.11 n is 64: -28 Carr If Radio Std is 802.11 n is 128: -58 Carr If Radio Std is 802.11 ac is 64: -28 Carr If Radio Std is 802.11 ac is 128: -58 Carr If Radio Std is 802.11 ac is 256: -122 Carr If Radio Std is 802.11 ac is 512: -250 Carr If Radio Std is 802.11 ah 1MHz: -13 Carr If Radio Std is 802.11 ah 2MHz: -28 Carr If Radio Std is 802.11 ah 4MHz: -58 Carr If Radio Std is 802.11 ah 8MHz: -122 Carr If Radio Std is 802.11 ah 16MHz: -250 Carr |
| State Saved | Saved in instrument state. |
| Min | -512.0 carriers |
| Max | 512.0 carriers |
| Initial S/W Revision | A.10.01 |

Help Map ID 45740

Scale/Div

Allows you to set the display X scale/division value.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real> :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:X:PDIV 1 DISP:FLAT:VIEW:WIND:TRAC:X:PDIV? |
| Notes | Default value is coupled with Radio Std and FFT Size |
| Couplings | If Auto Scaling is set to On, this value is automatically determined by the measurement result. When a value is set manually, Auto Scaling is automatically set to Off. |
| Preset | If Radio Std is 802.11a/g-ERP-OFDM/g-DSSS-OFDM: 5.2 Carr If Radio Std is 802.11n 20MHz: 5.6 Carr If Radio Std is 802.11n 40MHz: 11.6 Carr If Radio Std is 802.11ac 20MHz: 5.6 Carr If Radio Std is 802.11ac 40MHz: 11.6 Carr If Radio Std is 802.11ac 80MHz: 24.4 Carr If Radio Std is 802.11ac 160MHz: 50.0 Carr If Radio Std is 802.11ah 1MHz: 2.6 Carr If Radio Std is 802.11ah 2MHz: 5.6 Carr If Radio Std is 802.11ah 4MHz: 11.6 Carr If Radio Std is 802.11ah 8MHz: 24.4 Carr If Radio Std is 802.11ah 16MHz : 50.0 Carr |
| State Saved | Saved in instrument state. |
| Min | 0.1 carriers |
| Max | 51.2 carriers |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45741 |

Ref Position

Allows you to set the X reference position to the left, center, or right of the display.

| | |
|--------------------------|---|
| parameter_table_24.18339 | 54.41263 |
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT CENTER RIGHT :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:X:RPOS LEFT DISP:FLAT:VIEW:WIND:TRAC:X:RPOS? |
| Preset | LEFT |
| State Saved | Saved in instrument state. |
| Range | Left Ctr Right |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45742 |

Auto Scaling

Allows you to toggle the X Auto Scaling function between On and Off.

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | SPAN X Scale |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 1 OFF ON :DISPlay:FLATness:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle? |
| Example | DISP:FLAT:VIEW:WIND:TRAC:X:COUP OFF DISP:FLAT:VIEW:WIND:TRAC:X:COUP? |
| Couplings | Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values, based on the measurement results, if this parameter is set to On. When you manually set a value to either Rel Value or Scale/Div, X Auto Scaling is automatically set to Off. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45743 |

Sweep/Control

Accesses a menu that allows you to select parameters that affect the sweep of the displayed measurement signal.

Only the Pause/Resume key is available.

See Key and Command Descriptions – Sweep/Control@3273 for more information.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45744 |

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:PAUSE |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:RESume |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

System

See "System" on page 278

Trace/Detector

There is no local functionality for Trace/Detector.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45745 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See ["Trig Delay "](#) on page 350

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off"](#) on page 1255

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Relative Trigger

See ["Relative Trigger Level"](#) on page 1257

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay "](#) on page 354

Periodic Timer

See ["Periodic Timer \(Frame Trigger\) "](#) on page 1259

Period

See ["Period "](#) on page 1260

Offset

See ["Offset "](#) on page 1261

Offset Adjust (Remote Command Only)

See ["Offset Adjust \(Remote Command Only\)"](#) on page 1262

Reset Offset Display

See ["Reset Offset Display "](#) on page 1263

Sync Source

See ["Sync Source "](#) on page 1263

Off

See ["Off "](#) on page 1264

External 1

See "External 1 " on page 1264

Trigger Level

See "Trigger Level " on page 1264

Trig Slope

See "Trig Slope " on page 1265

External 2

See "External 2 " on page 1265

Trigger Level

See "Trigger Level " on page 1266

Trig Slope

See "Trig Slope " on page 1267

RF Burst

See "RF Burst " on page 1267

Absolute Trigger

See "Absolute Trigger Level" on page 1268

Trig Slope

See "Trigger Slope " on page 1269

Trig Delay

See "Trig Delay" on page 365

Auto/Holdoff

See "Auto/Holdoff " on page 1270

Auto Trig

See "Auto Trig " on page 1270

Trig Holdoff

See "Trig Holdoff " on page 1271

Holdoff Type

See "Holdoff Type" on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|----------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses the View/Display menu for the current measurement. This menu includes the Display key which allows you to access parameters that control the display. All softkeys in the “View/Display” menu work regardless of which result window currently has the focus.

| | |
|--------------------------|------------------------|
| parameter_table_24.18339 | 54.41263 |
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45746 |

This measurement consists of one view, and only one window.

Flatness window

| | |
|------------------------------|--------------------------------|
| non_parameter_table_19.64901 | 39.29801 |
| Marker Operation | Yes |
| Corresponding Trace | Corrected measured trace (n=1) |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

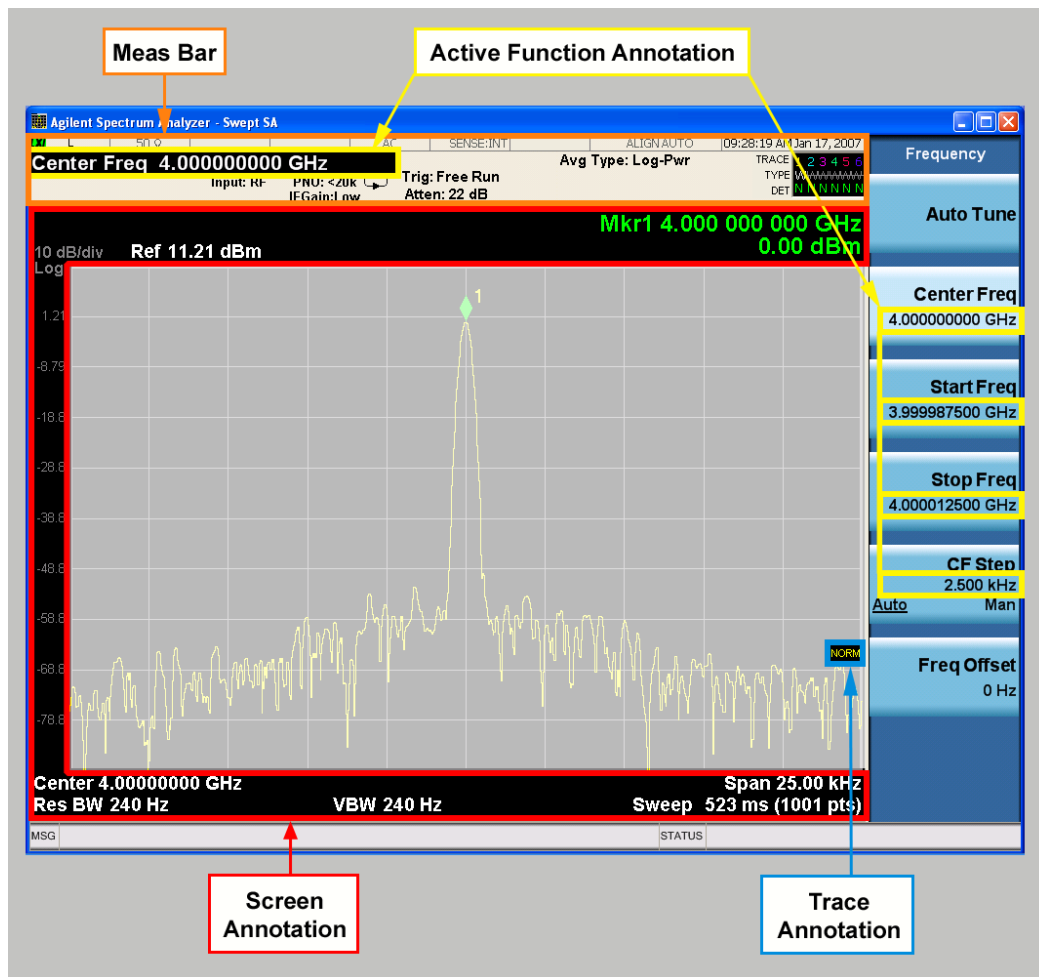
Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).

4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |

| | |
|----------------------|---|
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

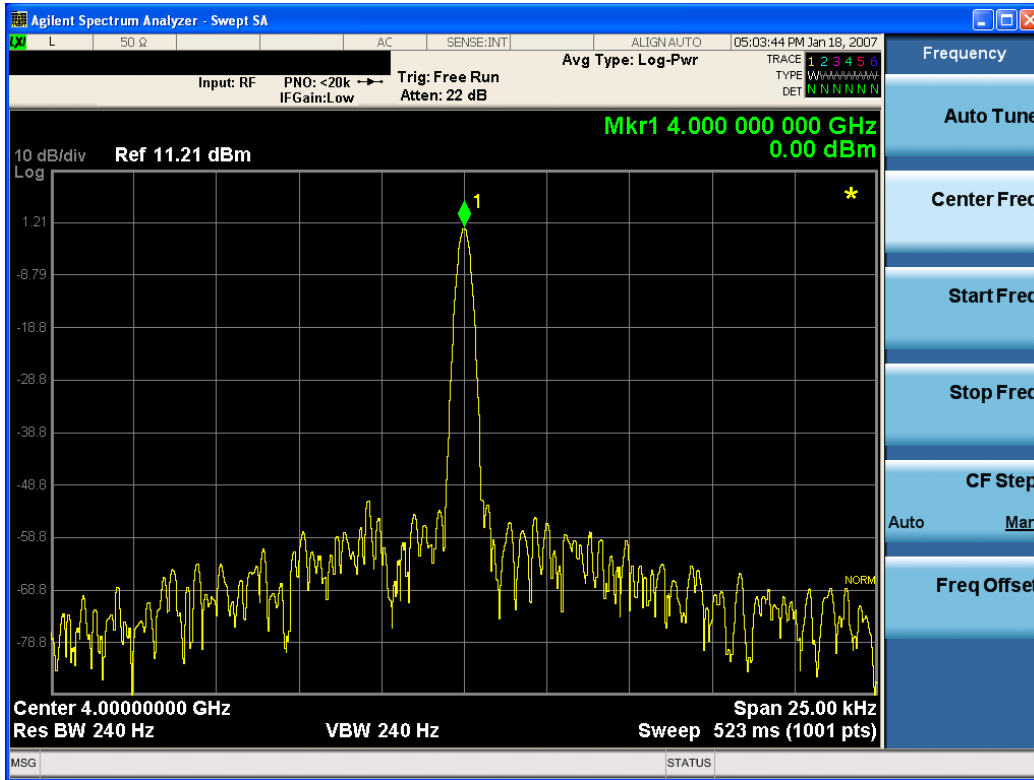
| | |
|-----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

12 Spectral Flatness Measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|----------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|----------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Limit Line

This key allows you to toggle the limit line on the view

| | |
|--------------------------|--|
| parameter_table_24.18339 | 54.41263 |
| Key Path | View/Display |
| Mode | WLAN |
| Remote Command | :DISPlay:FLATness:LLINe ON OFF 1 0 :DISPlay:FLATness:LLINe? |
| Example | DISP:FLAT:LLIN ON DISP:FLAT:LLIN? |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |
| Help Map ID | 45748 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

13 WLAN Modulation Analysis measurement

This section contains the following two topics

["Measurement Commands for Modulation Analysis" on page 1828](#)

["Remote Command Results for Modulation Analysis Measurement" on page 1829](#)

Measurement Commands for Modulation Analysis

The following commands are used to retrieve the measurement results:

:CONFigure:EVM

:CONFigure:EVM:NDEFault

:INITiate:EVM

:FETCh:EVM[n]?

:READ:EVM[n]?

:MEASure:EVM[n]?

For more measurement related commands, see the SENSE subsystem, and the section "[Remote Measurement Functions](#)" on page 2430.

Remote Command Results for Modulation Analysis Measurement

When Radio Std is 802.11ac 80+80MHz, these measurement results are also for one channel. Using SCPI “:CALCulte:EVM:SEGM” to specify that these contents are the first segment results or the second segment results.

If selects Radio Std 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah

| Index: n | Results Returned |
|----------------------|--|
| <Mnemonic> | |
| 0 | Returns unprocessed I/Q trace data of Capture Interval, as a series of trace point values. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| 1 (or not specified) | <p>Returns the following 43 comma-separated scalar results, results 41 and 42 will be -999, they are reserved for 802.11b/g (DSSS/CCK/PBCC):</p> <p>“Avg” means the average of the individual measurements when averaging is on. “Max” means the maximum of the individual measurements when averaging is on.</p> <ol style="list-style-type: none"> 1. RMS EVM Max (dB) 2. RMS EVM Avg (dB) 3. Peak EVM Max (dB) 4. Peak EVM Avg (dB) 5. Max Peak EVM Index 6. Peak EVM Index*** 7. Frequency Error Max (Hz) 8. Frequency Error Avg (Hz) 9. Frequency Error Max (ppm) * 10. Frequency Error Avg (ppm) * 11. Symbol Clock Error Max (ppm) 12. Symbol Clock Error Avg (ppm) 13. I/Q Origin Offset Max (dB) 14. I/Q Origin Offset Avg (dB) 15. Gain Imbalance Max 16. Gain Imbalance Avg 17. Quadrature error Max (degrees) 18. Quadrature error Avg (degrees) 19. Avg Burst Power Max (dBm) |

-
- 20. Avg Burst Power Avg (dBm)
 - 21. Peak Burst Power Max (dBm)
 - 22. Peak Burst Power Avg (dBm)
 - 23. Peak-to-Avg Burst Power Ratio Max
 - 24. Peak-to-Avg Burst Power Ratio Avg
 - 25. Data Modulation Format **
Data Bit Rate (KBits/s for 11 ah, MBits/s for other radio standard)
 - 26. Pilot EVM Max (dB)
 - 27. Pilot EVM Avg (dB)
 - 28. Data EVM Max (dB)
 - 29. Data EVM Avg (dB)
 - 31. IQ timing skew Max (for 802.11a/g, return -999.0)
 - 32. IQ timing skew Avg (for 802.11a/g, return -999.0)
 - 33. RMS EVM Max (%)
 - 34. RMS EVM Avg (%)
 - 35. Peak EVM Max (%)
 - 36. Peak EVM Avg (%)
 - 37. Pilot EVM Max (%)
 - 38. Pilot EVM Avg (%)
 - 39. Data EVM Max (%)
 - 40. Data EVM Avg (%)
 - 41. Reserved for 802.11b, return -999.0
 - 42. Reserved for 802.11b, return -999.0
 - 43. Burst Number analyzed in the last acquisition.

| | | |
|---|--|--|
| 2 | | EVM vs. Symbol trace . vs. Symbol trace of Capture Interval. The first number is the symbol 0 decision point. |
| 3 | | EVM vs. Carrier trace . vs. Carrier trace of Capture Interval. |
| 7 | | Corrected measured trace . , when the IQ Normalize is turned on. The first number is the in-phase (I) sample and the second is the quadrature-phase (Q) sample. |
| 8 | | Returns Demod Bits |

9

Returns 4 comma-separated scalar values of the pass/fail (0.0 = passed, or 1.0 = failed) results determined by testing the following items.

802.11 standard (OFDM) specifies that EVM / IQ offset pass fail test should use average value.

1. Test result of RMS EVM(Avg)
2. Test result of Frequency Error (Max)
3. Test result of symbol clock error(Max)
4. Test result of I/Q Origin Offset(Avg)

10

- If radio stand is 11n, return the decode bits of HT-SIG Signal.

- If radio stand is 11ac, return the decode bits of VHT-SIG-A and VHT_SIG_B Signal. the length of it depend on radio standard.

-For 11ac 20M, trace length is 48 + 26;

-For 11ac 40M, trace length is 48 + 27;

-For 11ac 80M,160M, 80+80M, trace length is 48 + 29;

- If radio standard is 11ah and PPDU format is greater than or equal to 2MHz long format, return the decode bits of SIG-A and SIG-B signal. The length of it depends on radio standard and MU/SU

-For SU, trace length is 48

| | |
|----|---|
| | <p>-For MU and 11ah 2MHz, trace length is 48 + 26;</p> <p>-For MU and 11ah 4MHz M, trace length is 48 + 27;</p> <p>-For MU and 11ah 8M/16MHz, trace length is 48 +29;</p> <ul style="list-style-type: none"> • If radio standard is 11ah and PPDU format is greater than or equal to 2MHz short format, return the decode bits of SIG fields which length is 48 bits. <p>If radio standard is 11ah and PPDU format is 1MHz short format, return the decode bits of SIG fields which length is 36 bits.</p> |
| 11 | Return the decode bits of L-SIG Signal. |
| 12 | Preamble Freq Error vs. Time, the total frequency error during the preamble portion of the OFDM burst. |
| 19 | IQ gain imbalance vs. Carrier trace . |
| 20 | IQ quadrature error vs. Carrier trace . |
| 21 | |
| 22 | |

* when the input is BBIQ, this number will be -999.0.

** This result will return integer numbers, 0 represents BPSK, 1 represents QPSK, 2 represents 16-QAM, 3 represents 64-QAM, 4 represents 256-QAM, 5 represents 1024-QAM.

*** Peak EVM Index is an instant value. While Average Number great than 1, Peak EVM Index is the last measurement's results in the average cycle.

If the Radio Std selects 802.11b/g (DSSS/CCK/PBCC)

| Index: n | Results Returned |
|----------|------------------|
|----------|------------------|

| <Mnemonic> | |
|----------------------|--|
| 0 | Returns unprocessed I/Q trace data of Capture Interval, as a series of trace point values. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| 1 (or not specified) | <p>Returns the following 42 comma-separated scalar results:</p> <p>“Avg” means the average of the individual measurements when averaging is on. “Max” means the maximum of the individual measurements when averaging is on. “Min” means the minimum of the individual measurements when averaging is on.</p> <ol style="list-style-type: none"> 1. RMS EVM Max (%) 2. RMS EVM Avg (%) 3. Peak EVM Max (%) 4. Peak EVM Avg (%) 5. Max Peak EVM Index 6. Peak EVM Index*** 7. Frequency Error Max (Hz) 8. Frequency Error Avg (Hz) 9. Frequency Error Max (ppm) * 10. Frequency Error Avg (ppm) * 11. Chip Clock Error Max (ppm) 12. Chip Clock Error Avg (ppm) 13. I/Q Origin Offset Max (dB) 14. I/Q Origin Offset Avg (dB) 15. Gain Imbalance Max 16. Gain Imbalance Avg 17. Quadrature error Max (degrees) 18. Quadrature error Avg (degrees) 19. 1000 chips Peak EVM (802.11–2007) Max (%) 20. 1000 chips Peak EVM (802.11–2007) Avg (%) 21. RMS Magnitude Error Max (%) 22. RMS Magnitude Error Avg (%) 23. Peak Magnitude Error Max (%) 24. Peak Magnitude Error Avg (%) 25. Max Peak Magnitude Error Index 26. Peak Magnitude Error Index*** 27. RMS Phase Error Max (degrees) 28. RMS Phase Error Avg (degrees) 29. Peak Phase Error Max (degrees) 30. Peak Phase Error Avg (degrees) 31. Max Peak Phase Error Index 32. Peak Phase Error Index*** |

| | |
|----|--|
| | <p>33. Carrier suppression Min (dB)</p> <p>34. Carrier suppression Avg (dB)</p> <p>35. Avg Burst Power Max (dBm)</p> <p>36. Avg Burst Power Avg (dBm)</p> <p>37. Peak Burst Power Max(dBm)</p> <p>38. Peak Burst Power Avg(dBm)</p> <p>39. Peak-to-Avg Burst Power Ratio Max</p> <p>40. Peak-to-Avg Burst Power Ratio Avg</p> <p>41. Data Modulation Format **</p> <p>42. Data Bit Rate (Mbits/s)</p> <p>43. Burst Number analyzed in the last acquisition.</p> |
| 4 | EVM trace . the EVM value for each chip in the measurement interval. |
| 5 | Magnitude error trace . the magnitude error value for each chip in the measurement interval. |
| 6 | Phase error trace . the phase error value for each chip in the measurement interval. |
| 7 | Corrected measured trace . , when the IQ Normalize is turned on. The first number is the in-phase (I) sample of chip 0 decision point and the second is the quadrature-phase (Q) sample of chip 0 decision point |
| 8 | Returns Demod Bits |
| 9 | <p>Returns 5 comma-separated scalar values of the pass/fail (0.0 = passed, or 1.0 = failed) results determined by testing the following items.</p> <p>802.11 standard (OFDA) specifies that EVM / IQ offset pass fail test should use average value. To keep consistent in one mode, also change 802.11b EVM / carrier suppression pass fail test to use average value.</p> <ol style="list-style-type: none"> 1. Test result of RMS EVM (Avg) 2. Test result of 1000 Chips EVM (Avg) 3. Test result of Frequency Error (Max) 4. Test result of RF Carrier Suppression (Min) 5. Test result of Chip clock error (Avg) |
| 10 | Return the demod bits of PLCP Preamble. |

11

Return the demod bits of PLCP Header.

* when the input is BBIQ, this number will be -999.0

** this result will return integer numbers, 0 represents DSSS1, 1 represents DSSS2, 2 represents CCK5.5, 3 represents CCK11, 4 represents PBCC5.5, 5 represents PBCC11, 6 represents PBCC22, 7 represents PBCC33.

*** Peak EVM Index, Peak Magnitude Error Index and Peak Phase Error Index are instant value. While Average Number great than 1, they keep the last measurement's results in the average cycle.

Selects the Modulation Analysis measurement.

| Key Path | Meas |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Range

The Range menu allows setting amplitude controls of the instrument.

| Key Path | AMPTD Y Scale |
|----------------------|---------------|
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| Key Path | Range |
|-----------------------|---|
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation OFF ON ELECTrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|----------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |

| | |
|----------------------|---------------------------|
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|-----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real> [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet? |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 1839

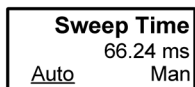
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPle ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

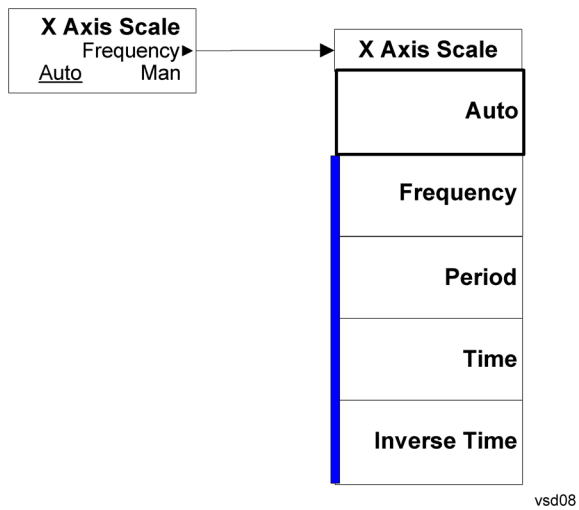
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

Accesses a menu that allows you to control bandwidth settings.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Info BW

Activates the **Info BW** active function, which allows you to manually set the information bandwidth (Info BW) of the analyzer.

| | |
|-------------------------------------|--|
| Key Path | BW |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM: BANDwidth [:RESolution] <bandwidth> [:SENSe] :EVM: BANDwidth [:RESolution] ? |
| Example | EVM: BAND 20e6 EVM: BAND ? |
| Couplings | Info BW is coupled with Subcarrier Spacing |
| Preset | Info BW is limited by hardware capability if Radio Std is 802.11a/b/g = 25MHz if Radio Std is 802.11n-20M = 25MHz if Radio Std is 802.11n-40M = 40MHz if Radio Std is 802.11ac-20M = 25MHz if Radio Std is 802.11ac-40M = 40MHz if Radio Std is 802.11ac-80M / 80M+ 80M = 80MHz if Radio Std is 802.11ac-160M = 160MHz if Radio Std is 802.11ah-1MHz : 3MHz if Radio Std is 802.11ah-2M = 3MHz if Radio Std is 802.11ah-4M = 4MHz if Radio Std is 802.11ah-8M = 8MHz if Radio Std is 802.11ah-16M = 16MHz (25MHz if only B25 option installed) if Radio Std is 802.11j/p-10M = 10MHz if Radio Std is 802.11p-5M = 5MHz |
| State Saved | Saved in instrument state. |
| Min | 1 kHz |
| Max | Hardware Dependent: B25 = 25 MHz WB (40 MHz or wider) = Hardware Option Limit |
| Backwards Compatibility SCPI | [:SENSe] :EVM: I FBW |

| | |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |
|----------------------|---------|

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

13 WLAN Modulation Analysis measurement
Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1849](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1851](#)

See ["Center Frequency Presets" on page 1847](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 1847 and "RF Center Freq" on page 1849 and Ext Mix Center Freq and "I/Q Center Freq" on page 1851. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1847 and "RF Center Freq" on page 1849 and "I/Q Center Freq" on page 1851. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1847 and "RF Center Freq" on page 1849 and "I/Q Center Freq" on page 1851. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

13 WLAN Modulation Analysis measurement
 FREQ Channel

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code> |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|---|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENt 60 GHz</code> <code>:FREQ:EMIX:CENt?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|-----------------------|---|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP [:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500 MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO? |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | Span, RBW, Center frequency If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | Auto ADEM0D: 1 MHz ON |
| State Saved | Saved in instrument state |
| Min | – (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Input/Output

See "Input/Output" on page 162

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Select Marker

Displays 12 markers available for selection.

| Key Path | Marker |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area.

Active Function Display:

Marker index at I/Q Measured Polar Vector graph

Marker X-axis value at other graphs

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

The marker X axis value entered in the active function area displays the marker value to its full entered precision.

| Key Path | Marker |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:MODE POSition DELTA OFF :CALCulate:EVM:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:EVM:MARK:MODE POS CALC:EVM:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: The active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: |

- the marker index for the IQ Measured Polar Vector graph
 - the marker X axis value for any other graph
 The value entered in the active function area displays the marker value to its full entered precision.

| | |
|----------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta Off |
| Initial S/W Revision | A.10.01 |

Properties

Accesses a menu that enables you to select a reference marker and marker trace.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.10.01 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.10.01 |

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

| | |
|-----------------------|--|
| Key Path | Marker, Properties |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:EVM:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:EVM:MARK:REF 3 CALC:EVM:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried, a single value is returned (the specified marker number's relative marker). |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |

| | |
|----------------------|---------|
| Max | 12 |
| Initial S/W Revision | A.10.01 |

Marker Trace

Assigns the specified marker to the designated trace.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:TRACe POLar EVM MERRor PERRor EVMS EVMC PFERRor IQGain IQQuad IQTime :CALCulate:EVM:MARKer[1] 2 ... 12:TRACe? |
| Example | CALC:EVM:MARK2:TRAC EVM CALC:EVM:MARK:TRACE? |
| Couplings | EVM, MERRor, PERRor, PFERRor will be available if the Radio Std is 802.11b/g (DSSS/CCK/PBCC), otherwise they are grayed out EVMS and EVMC will be available if the Radio Std is 802.11 a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah otherwise they are grayed out IQGain, IQQuad, and IQTime will be available if the Radio Std is 802.11 n , 802.11ac or 802.11ah, otherwise they are grayed out. |
| Preset | POLar |
| State Saved | Saved in instrument state. |
| Range | EVM Mag Err Phase Err EVM vs Symbol EVM vs Carrier IQ Polar |
| Initial S/W Revision | A.10.01 |

Marker Trace

Accesses a menu that enables you to assign a specified marker to the designated trace.

Symbol Traces means that three traces for I/Q polar, Symbol Error Carrier, Symbol Error Symbol, Symbol Power Carrier, and Symbol Power Symbol can be assigned. If used, a marker pointer is placed on each trace. In this case, the three pointers will move at the same time, as coupled markers, whenever the X position of the Symbol Traces changes.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:TRACe SYMBol POLar EVCarrier RECarrier EVSymbol RESymbol PCARrier RPCarrier PSYMBOL RPSymbol FLATness DFLatness PVT SPECTrum :CALCulate:EVM:MARKer[1] 2 ... 12:TRACe? |

| | |
|----------------------|--|
| Example | CALC:EVM:MARK:TRAC SYMB CALC:EVM:MARK:TRAC? |
| Preset | SYMB |
| State Saved | Saved in instrument state. |
| Range | Symbol Traces IQ Measured Polar ConstIn Error Vector Carrier RMS Error Vector Carrier Error Vector Symbol RMS Error Vector Symbol Symbol Power Carrier RMS Symbol Power Carrier Symbol Power Symbol RMS Symbol Power Symbol PvT Spectrum |
| Initial S/W Revision | Prior to A.02.00 |

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an “equal X Axis movement” of every other marker which is active. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going offscreen.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EVM:MARKer:COUPle[:STATe]? |
| Example | CALC:EVM:MARK:COUP ON CALC:EVM:MARK:COUP? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

All Markers Off

Turns off all markers.

| | |
|-----------------------|----------------------------|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer:AOFF |
| Example | CALC:EVM:MARK:AOFF |
| Initial S/W Revision | A.10.01 |

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:X <real> :CALCulate:EVM:MARKer[1] 2 ... 12:X? |
| Example | CALC:EVM:MARK3:X 0 CALC:EVM:MARK3:X? |
| Notes | If no suffix is sent, it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an "Invalid suffix" error will be generated. The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time , seconds for Period and Time . If the marker is Off the response is not a number (NAN). |
| Preset | After a preset, all markers are set to Off, so a Marker X Axis Value query will return a not a number (NAN). |
| State Saved | Saved in instrument state. |
| Min | -9.9E+37 |
| Max | 9.9E+37. |
| Initial S/W Revision | A.10.01 |

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** - except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

| | |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:X:POsition <real> :CALCulate:EVM:MARKer[1] 2 ... 12:X:POsition? |
| Example | CALC:EVM:MARK10:X:POS 10 CALC:EVM:MARK10:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal , or the offset from the marker's reference marker in trace points, if the control mode is Delta . The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is Off the response is not a number(NAN). |
| Preset | After a preset, all markers are set to Off, so Marker X Axis Position query will return a not a number (NAN). |
| State Saved | Saved in instrument state. |

| | |
|----------------------|----------|
| Min | -9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | A.10.01 |

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:Y? |
| Example | CALC:EVM:MARK11:Y? |
| Notes | <p>The query returns the marker Y-axis result if the control mode is Normal or Delta. If the marker is Off the response is not a number (NAN)</p> <p>Query results depend on the selected Marker Trace as follows:</p> <p>I/Q Measured Polar: I, Q (In normalized voltage)</p> <p>EVM vs. Symbol: EVM(dB)</p> <p>EVM vs. Carrier: EVM(dB)</p> <p>Mag Error: Mag Err(%)</p> <p>Phase Error: Phase Err(°)</p> <p>EVM: EVM(%)</p> |
| Preset | Result dependant on Markers setup and signal source |
| State Saved | No |
| Initial S/W Revision | A.10.01 |

Backward Compatibility SCPI Commands

Sets or queries the state of a marker. Setting a marker which is Off to On, or 1, puts it in Normal mode and places it at the center of the screen.

| | |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ... 12:STATe OFF ON 0 1 :CALCulate:EVM:MARKer[1] 2 ... 12:STATe? |
| Example | CALC:EVM:MARK3:STAT ON CALC:EVM:MARK3:STAT? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Marker Function

There are no 'Marker Functions' supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Marker To

There is no 'Marker To' functionality supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 2431](#)

["Current Measurement Query \(Remote Command Only\)" on page 2433](#)

["Limit Test Current Results \(Remote Command Only\)" on page 2433](#)

["Data Query \(Remote Command Only\)" on page 2433](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 2434](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 2439](#)

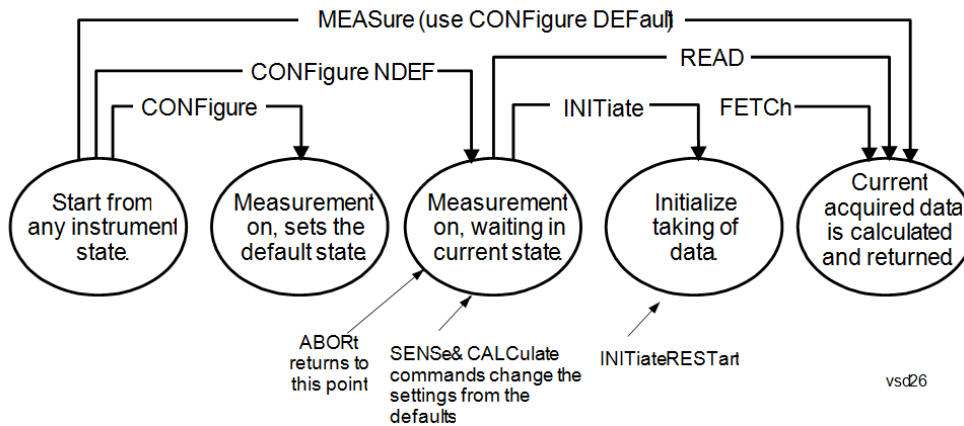
["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 2440](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 2454](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 2455](#)

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| Initial S/W Revision | Prior to A.02.00 |
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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
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Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

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|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
| Initial S/W Revision | Prior to A.02.00 |

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

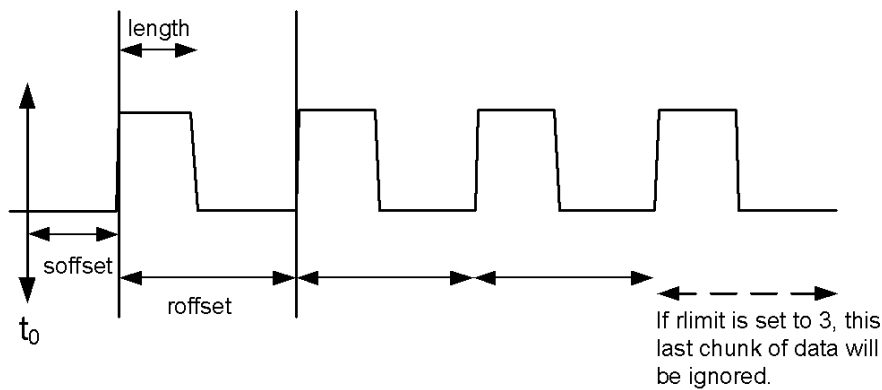
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

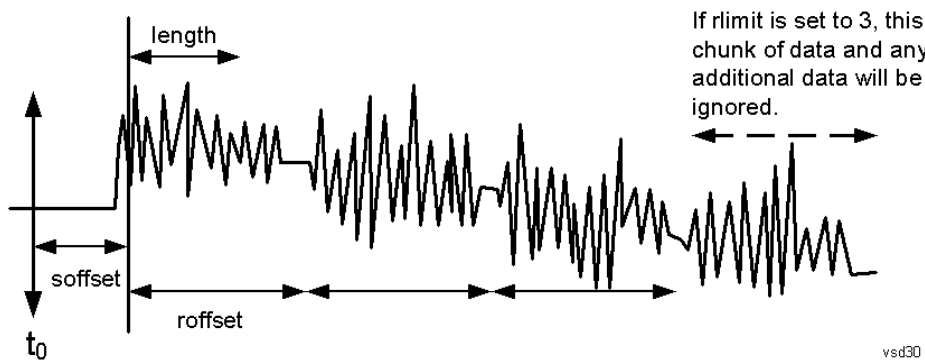
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|---|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLline LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
|-----------------------|---|

| | |
|----------------|---|
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
|----------------|---|

| | |
|--------------|---|
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|-------------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 - 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

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| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

M All
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-----
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-----
E :CALC:FPOW:POW1:DEF?

```

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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
|-------------|---------|
| Initial S/W | A.14.00 |
| Revision | |

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMAl order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMAl SWAPped :FORMat:BORDER? |
| Preset | NORMAl |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Accesses the measurement setup menu for the current measurement.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Avg/Burst Number

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action.

Avg number is the number of bursts, is NOT the number of data acquisition. If search length is large enough to include all the bursts, acquisition will only execute once (single mode). If the bursts number include in one capture is smaller than average number, multi capture and measurement is necessary.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

| Key Path | Meas Setup |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:AVERage:COUNT <integer> [:SENSe] :EVM:AVERage:COUNT? [:SENSe] :EVM:AVERage [:STATe] OFF ON 0 1 [:SENSe] :EVM:AVERage [:STATe] ? |
| Example | EVM:AVER:COUN 1 EVM:AVER:COUN? EVM:AVER OFF EVM:AVER? |
| Preset | 10 ON |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | A.10.01 |

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

| | |
|-----------------|---|
| KEY:Exponential | After the average count is reached, each successive data acquisition is exponentially |
|-----------------|---|

| | |
|------------------|--|
| SCPI:EXPonential | weighted and combined with the existing average. |
| KEY:Repeat | After reaching the average count, the averaging is reset and a new average is started. |
| SCPI:REPeat | The default value is Exp. |

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:AVERAge:TCONtrol EXPonential REPeat [:SENSe] :EVM:AVERAge:TCONtrol ? |
| Example | EVM:AVER:TCON REP EVM:AVER:TCON ? |
| Preset | EXP |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | A.10.01 |

Meas Time

Accesses the meas time menu for the current measurement.

| Key Path | Meas Setup |
|----------------------|------------|
| Initial S/W Revision | A.10.01 |

Search Length

Sets the length of time to acquire the input signal. This defines the length of time that the burst search is performed.

The analyzer searches within the specified search length, find all burst positions within this search length, and demodulates burst one by one if average state is on and average number is still not reached. If one acquisition does not include total required bursts, multi capture is needed. So if want to get results for continues bursts, make sure search length is large enough to include all the bursts. Otherwise multi acquisitions will be performed.

| Key Path | Meas Setup, Meas Time |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:SLENgth <time> [:SENSe] :EVM:TIME:SLENgth ? [:SENSe] :EVM:TIME:SEARchlength <real> [:SENSe] :EVM:TIME:SEARchlength ? |

| | |
|-------------------------------------|---|
| Example | EVM:TIME:SLEN 1 ms EVM:TIME:SLEN? |
| Notes | Min Value is coupled with Radio Std, Result Length, Guard Interval and Subcarrier Spacing Max Value is coupled with Radio Std, Info BW |
| Preset | 1.0 ms |
| State Saved | Saved in instrument state. |
| Min | <p>If Radio Std is 802.11a/g/j/p (OFDM) or 801.11g (DSSS-OFDM) If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 9) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing } s$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 9) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Radio Std is 802.11n (20 MHz)/(40 MHz): If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing } s$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Radio Std is 802.11ac or 802.11ah If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing } s$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Radio Std is 802.11b/g (DSSS/CCK/PBCC): If Result Length is set to Man, Min Value will be: Ceil (Result Length/Chip Rate) usec If Result Length is set to Auto, Min Value will be: Ceil (Max Result Length/Chip Rate) usec</p> |
| Max | <p>Hardware Dependent: 4000000 / Sampling Rate B25: Sampling Rate = 45M (when info BW is 25MHz); WB (B40 or Wider): Sampling Rate = Info BW * 1.25</p> |
| Backwards Compatibility SCPI | [:SENSE] :EVM:TIME:SEARChlength |
| Initial S/W Revision | A.10.01 |

Meas Interval

For standard 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, or 802.11ah:

This parameter specifies the measurement interval (length), in symbol times, of the portion of the OFDM burst that will be analyzed. This analyzed portion of the OFDM burst starts at a measurement offset specified by Meas Offset.

| Key Path | Meas Setup, Meas Time |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:INTerval <integer> [:SENSe] :EVM:TIME:INTerval? |
| Example | EVM:TIME:INT 15 EVM:TIME:INT? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2794 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 1 symbols 802.11b/g (DSSS/CCK/PBCC): 1 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM): 1367 symbols 802.11n , 802.11ac, and 802.11ah: 21848 symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability. |
| Initial S/W Revision | A.10.01 |

Meas Offset

802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah:

This parameter specifies the measurement offset, in symbol times, of the portion of the OFDM burst that will be analyzed. The length of this analyzed portion of the OFDM burst is specified by Meas Interval.

802.11b/g (DSSS/CCK/PBCC):

Used to set the measurement offset, in chips, of the portion of the WLAN burst that will be analyzed. The length of this analyzed portion of the WLAN burst is specified by Meas Interval. If the specified measurement offset is less than zero, a value of zero is used instead.

The measurement interval and offset are relative to the ideal starting point of the PLCP preamble portion of the burst. For a signal that uses the long PLCP format, the ideal starting point of the PLCP preamble is exactly 128 symbol times (128*11 chip times) before the start of the SFD sync pattern. For a signal that uses the short PLCP format, the ideal starting point of the PLCP preamble is exactly 56 symbol times (56*11 chip times) before the start of the SFD sync pattern.

| Key Path | Meas Setup, Meas Time |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:OFFSet <integer> [:SENSe] :EVM:TIME:OFFSet? |

| | |
|----------------------|---|
| Example | EVM:TIME:OFFS 15 EVM:TIME:OFFS? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std and Result Length |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 0 symbols 802.11b/g (DSSS/CCK/PBCC): 22 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 0 symbols 802.11b/g (DSSS/CCK/PBCC): 0 chips |
| Max | If Result Length is Auto, then the specified measurement offset will be clipped to be less than or equal to the value of Max Result Length – Meas Interval. If Result Length is Man, then the specified measurement offset will be clipped to be less than or equal to the value of Result Length – Meas Interval. |
| Initial S/W Revision | A.10.01 |

Result Length

For 802.11a/g/j/p (OFDM) and 801.11g (DSSS-OFDM), when Result Length is Auto, the length of the burst is auto-detected. The result length is determined from the decoded SIGNAL symbol. The value of Max Result Length specifies the maximum result length for the burst; any burst longer than that will be treated as though that were the length of the burst.

When Result Length is Man, you can specify the result length of the burst regardless of the actual length of the burst.

- For 802.11n, if From HT-Sig is On:

The result length is detected from the High Throughput Signal Field. It compares the decode length information to the Max Result Length parameter and uses the smaller value as the measurement result length.

- For 802.11n, if From HT-Sig is Off:

When Result Length is Auto, the analyzer automatically determines the measurement result length by burst search. It compares the detected result length to the Max Result Length parameter and uses the smaller value as the measurement result length.

When Result Length is Man, it compares the input result length to the Result Length parameter and uses the smaller value as the measurement.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:LENGth <integer> [:SENSe] :EVM:TIME:RESult:LENGth? [:SENSe] :EVM:TIME:RESult [:STATe] :AUTO OFF ON 0 1 [:SENSe] :EVM:TIME:RESult [:STATe] :AUTO? |

| | |
|----------------------|--|
| Example | EVM:TIME:RES:LENG 10 EVM:TIME:RES:LENG? EVM:TIME:RES:AUTO ON EVM:TIME:RES:AUTO? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2816 chips ON |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 2 symbols 802.11b/g (DSSS/CCK/PBCC): 150 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM): 1367 symbols 802.11n , 802.11ac, and 802.11ah: 21848 symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability |
| Initial S/W Revision | A.10.01 |

Max Result Length

Max Result Length specifies a maximum result length.

If the auto-detected length is greater than the specified maximum result length, the maximum result length is used instead.

The actual results returned will be for a subset of this maximum, as specified by the Meas Interval and Meas Offset, and will be further limited to the auto-detected result length if that is shorter than the maximum result length.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:MAX <integer> [:SENSe] :EVM:TIME:RESult:MAX? |
| Example | EVM:TIME:RES:MAX 45 EVM:TIME:RES:MAX? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2816 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 2 symbols 802.11b/g (DSSS/CCK/PBCC): 150 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 21848 |

| | |
|-------------------------------------|---|
| | symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TIME:RESMax <integer> |
| | [:SENSe] :EVM:TIME:RESMax? |
| Initial S/W Revision | A.10.01 |

From SIG Symbols

- For 802.11n, if From SIG Syms is On:

The result length is detected from the High Throughput Signal Field. It compares the decoded length information to the Max Result Length parameter and uses the smaller value as the measurement result length.

- For 802.11n, if From SIG Syms Off:

When Result Length is Auto, the analyzer automatically determines the measurement result length by burst search. It compares the detected result length to Max Result Length parameter and uses the smaller value as the measurement result length.

When Result Length is Man, it compares the input result length to the Result Length parameter and uses the smaller value as the measurement.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:SIG OFF ON 0 1 [:SENSe] :EVM:TIME:RESult:SIG? |
| Example | EVM:TIME:RES:SIG ON EVM:TIME:RES:SIG? |
| Notes | If Radio Std is not 802.11n, 802.11ac or 802.11ah, it will be grayed out. The result length is determined by decoding the HT-SIG symbols and using the HT Length field. The value of Max Result Length specifies a maximum result length for the pulse; any pulse longer than that will be treated as though that were the length of the pulse. |
| Dependencies | The key is NOT available when Radio Std is 802.11b/g (DSSS/CCK/PBCC). |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Subcarrier

This parameter specifies whether the demodulation results are for all subcarriers in the signal, or for a single subcarrier, or for just the pilot subcarriers.

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SUBCarrier ALL PILOt SINGle :CALCulate:EVM:SUBCarrier? |
| Example | CALC:EVM:SUBC ALL CALC:EVM:SUBC? |
| Notes | Only effective in OFDM demodulation, if Radio Std is 802.11b/g (DSSS/CCK/PBCC), this key will be NOT available. |
| Preset | ALL |
| State Saved | Saved in instrument state. |
| Range | All Pilot Single |
| Readback Text | All Pilot subcarrier number (in integer format, like "Subcarrier 2") |
| Initial S/W Revision | A.10.01 |

Subcarrier Number

This parameter specifies the demodulation results are for which subcarrier. When Subcarrier selects "Single", this number will indicate which subcarrier is used to do demodulation.

| Key Path | Meas Setup |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SUBCarrier:COUNT <integer> :CALCulate:EVM:SUBCarrier:COUNT |
| Example | CALC:EVM:SUBC:COUN 2 CALC:EVM:SUBC:COUN? |
| Notes | Only be available as in OFDM demodulation and Subcarrier is selected as Single, otherwise this key will be grayed out. For Radio Std 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz), 802.11ac (20 MHz), 802.11ah(1MHz), and 802.11ah (2 MHz) if the value was set to 0, it will change to 1. For Radio Std 802.11n (40MHz), 802.11ac (40MHz), 802.11ac (80MHz) or 802.11ac (80 + 80MHz), 802.11ah (4MHz), 802.11ah(8MHz), if the value was set to 0, it will be change to 2. For Radio Std 802.11ac (160MHz), and 802.11ah (16MHz), if the value was set to 0, it will be change to 6. |
| Dependencies | Only effective in OFDM demodulation, if Radio Std is 802.11b/g (DSSS/CCK/PBCC), this key will be NOT available. |
| Couplings | Valid only when Subcarrier selects "Single". Min and Max Value is coupled with Radio Std. |
| Preset | Radio Std 802.11ac (160MHz): 6 |

| | |
|----------------------|--|
| | Others : 2 |
| State Saved | Saved in instrument state. |
| Min | -26: if Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) -28: if Radio Std is 802.11n 20 MHz, 802.11ac 20 MHz. -58: if Radio Std is 802.11n 40 MHz, 802.11ac 40 MHz -122: if Radio std is 802.11ac 80MHz, 802.11ac 80+80MHz -250: if Radio std is 802.11ac 160MHz -13: if Radio Std is 802.11ah 1MHz -29: if Radio Std is 802.11ah 2MHz -61: if Radio Std is 802.11ah 4MHz -125: if Radio Std is 802.11ah 8MHz -253: if Radio Std is 802.11ah 16MHz |
| Max | 26: if Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) 28: if Radio Std is 802.11n 20 MHz, 802.11ac 20 MHz 58: if Radio Std is 802.11n 40 MHz, 802.11ac 40 MHz 122: if Radio std is 802.11ac 80MHz, 802.11ac 80+80MHz 250: if Radio std is 802.11ac 160MHz 13: if Radio Std is 802.11ah 1MHz 29: if Radio Std is 802.11ah 2MHz 61: if Radio Std is 802.11ah 4MHz 125: if Radio Std is 802.11ah 8MHz 253: if Radio Std is 802.11ah 16MHz |
| Initial S/W Revision | A.10.01 |

Subcarrier I/Q Estimation

This parameter allows turn On or Off the estimation for IQ Gain Imbalance vs. subcarrier, IQ Quadrature Error vs. subcarrier in the input signal.

| | |
|----------------|---|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:IQEstimation OFF ON 0 1 :CALCulate:EVM:IQEstimation? |
| Example | CALC:EVM: IQES ON CALC:EVM: IQES? |
| Notes | The accuracy of the IQ gain imbalance and quadrature error estimation is affected by the receiver's ability to determine the correct ideal reference constellation points for each symbol in the modulated signal. Large IQ impairments may result in incorrect determination of reference points, which will lead to incorrect estimates for the IQ errors. Generally, the receiver can provide correct IQ estimation with greater levels of IQ impairment for lower-order modulation such as QPSK than for higher-order modulation such as 64QAM. |

| | |
|----------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.14.01 |

Limits

Accesses the Limits menu allows you to set the fail/pass criteria of the limit check

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

BPSK-1/2 RMS EVM

Sets BPSK coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:BPSK:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:BPSK:R1B2 |
| Example | CALC:EVM:LIM:RMS:BPSK:R1B2 -20 CALC:EVM:LIM:RMS:BPSK:R1B2? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -5.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

QPSK-1/2 RMS EVM

Sets QPSK coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QPSK:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QPSK:R1B2 |

| | |
|----------------------|---|
| Example | CALC:EVM:LIM:RMS:QPSK:R1B2 -20 CALC:EVM:LIM:RMS:QPSK:R1B2? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -10.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

QPSK-3/4 RMS EVM

Sets QPSK coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QPSK:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QPSK:R3B4 |
| Example | CALC:EVM:LIM:RMS:QPSK:R3B4 -20 CALC:EVM:LIM:RMS:QPSK:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -13.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

16QAM-1/2 RMS EVM

Sets 16QAM coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA16:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA16:R1B2 |
| Example | CALC:EVM:LIM:RMS:QA16:R1B2 -20 CALC:EVM:LIM:RMS:QA16:R1B2? |

| | |
|----------------------|---|
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -16.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

16QAM-3/4 RMS EVM

Sets 16QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA16:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA16:R3B4? |
| Example | CALC:EVM:LIM:RMS:QA16:R3B4 -20 CALC:EVM:LIM:RMS:QA16:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -19.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-2/3 RMS EVM

Sets 64QAM coding rate 2/3 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R2B3 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R2B3? |
| Example | CALC:EVM:LIM:RMS:QA64:R2B3 -20 CALC:EVM:LIM:RMS:QA64:R2B3? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -22.00 dB |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-3/4 RMS EVM

Sets 64QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R3B4 |
| Example | CALC:EVM:LIM:RMS:QA64:R3B4 -20 CALC:EVM:LIM:RMS:QA64:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -25.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-5/6 RMS EVM

Sets 64QAM coding rate 5/6 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R5B6 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R5B6 |
| Example | CALC:EVM:LIM:RMS:QA64:R5B6 -20 CALC:EVM:LIM:RMS:QA64:R5B6? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -27.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |

| | |
|----------------------|---------|
| Max | 0 |
| Initial S/W Revision | A.10.01 |

256QAM–3/4 RMS EVM

Sets 256QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit. When the average RMS EVM result exceeds the limit, a red FAIL indicator appears in the PASS/FAIL indication. When the average RMS EVM result is less than the limit, a green PASS indicator appears in the PASS/FAIL indication.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA256:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA256:R3B4 |
| Example | CALC:EVM:LIM:RMS:QA256:R3B4 -20 CALC:EVM:LIM:RMS:QA256:R3B4? |
| Notes | This limit value is used in 802.11ac or 802.11ah |
| Preset | -30.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.11.01 |

256QAM–5/6 RMS EVM

Sets 256QAM coding rate 5/6 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit. When the average RMS EVM result exceeds the limit, a red FAIL indicator appears in the PASS/FAIL indication. When the average RMS EVM result is less than the limit, a green PASS indicator appears in the PASS/FAIL indication.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA256:R5B6 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA256:R5B6 |
| Example | CALC:EVM:LIM:RMS:QA256:R5B6 -20 CALC:EVM:LIM:RMS:QA256:R5B6? |
| Notes | This limit value is used in 802.11ac or 802.11ah |
| Preset | -32.00 dB |
| State Saved | Saved in instrument state. |

| | |
|----------------------|----------|
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.11.01 |

Freq Error

Sets a frequency error limit to warn you if the measured maximum frequency error value exceeds the limit.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:FERRor <real> :CALCulate:EVM:LIMit:FERRor ? |
| Example | CALC:EVM:LIM:FERR 15 CALC:EVM:LIM:FERR? |
| Couplings | If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) and Center Frequency is above 5GHz, freq error limit will be coupled to 20.0ppm |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 802.11ac or 802.11ah: 20.00 ppm If Radio Std is 802.11b/g (DSSS/CCK/PBCC), 801.11g (DSSS-OFDM): 25.00 ppm If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) : 25.0ppm |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 500 ppm |
| Initial S/W Revision | A.10.01 |

Clock Error

Sets a clock error limit to warn you if the measured maximum clock error value exceeds the limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CLKerror <real> :CALCulate:EVM:LIMit:CLKerror ? |
| Example | CALC:EVM:LIM:CLK 15 CALC:EVM:LIM:CLK? |
| Couplings | If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) and Center Frequency is above 5GHz, freq error limit will be coupled to 20.0ppm |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 802.11ac or 802.11ah: 20.00 ppm If Radio Std is 802.11b/g (DSSS/CCK/PBCC), 801.11g (DSSS-OFDM): 25.00 ppm If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) : 25.0ppm |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100 ppm |
| Initial S/W Revision | A.10.01 |

Center Freq Leakage

Sets Center Freq Leakage limit to warn you if the measured average Center Freq Leakage exceeds the limit.

| Key Path | Meas Setup, Limits |
|-------------------------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CFLeakage <rel_ampl> :CALCulate:EVM:LIMit: CFLeakage? |
| Example | CALC:EVM:LIM:CFL -15 CALC:EVM:LIM:CFL? |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz): -15dB If Radio Std is 802.11n (40 MHz): -20 dB If Radio Std is 802.11ac: $-10\log_{10}(N)$ (N is fft length) 11ac20M: -18dB 11ac40M: -21dB 11ac80M: -24dB 11ac160M: -27dB If Radio Std is 802.11ah: $-10\log_{10}(N)$ (N is fft length) 11ah 1M: -15dB 11ah 2M: -18dB 11ah 4M: -21dB 11ah 8M: -24dB 11ah 16M: -27dB |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 0 |
| Backwards Compatibility SCPI | :CALCulate:EVM:LIMit:IQOffset <rel_ampl> |
| Initial S/W Revision | A.10.01 |

48 Mbits/s RMS EVM

Sets 48 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M48 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M48? |
| Example | CALC:EVM:LIM:RMS:M48 -20 CALC:EVM:LIM:RMS:M48? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -22.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

54 Mbits/s RMS EVM

Sets 54 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M54 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M54? |
| Example | CALC:EVM:LIM:RMS:M54 -20 CALC:EVM:LIM:RMS:M54? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -25.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

RMS EVM

Sets an RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS <percent> :CALCulate:EVM:LIMit:RMS? |

| | |
|----------------------|---|
| Example | CALC:EVM:LIM:RMS 20 CALC:EVM:LIM:RMS? |
| Notes | This limit value is used in 802.11b/g (DSSS/CCK/PBCC) |
| Preset | 16.0 % |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100.0 % |
| Initial S/W Revision | A.10.01 |

1000 Chips EVM

Sets an 1000 Chips EVM limit to warn you if the measured average 1000 Chips value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CHIP <percent> :CALCulate:EVM:LIMit:CHIP? |
| Example | CALC:EVM:LIM:CHIP 20 CALC:EVM:LIM:CHIP? |
| Notes | This limit value is used in 802.11b/g (DSSS/CCK/PBCC) |
| Preset | 35.0 % |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100.0 % |
| Initial S/W Revision | A.10.01 |

RF Carrier Suppression

Sets an RF Carrier Suppression limit to warn you if the measured average RF Carrier Suppression value is less than a limit.

| | |
|-----------------------|--|
| Key Path | Meas Setup, More, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CARRier <rel_ampl> :CALCulate:EVM:LIMit:CARRier? |
| Example | CALC:EVM:LIM:CARR 20 CALC:EVM:LIM:CARR? |
| Notes | This limit value is used in 802.11b/g (DSSS/CCK/PBCC) |
| Preset | 15.00 |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100.00 |
| Initial S/W Revision | A.10.01 |

6 Mbits/s RMS EVM

Sets 6 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M6 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M6? |
| Example | CALC:EVM:LIM:RMS:M6 -20 CALC:EVM:LIM:RMS:M6? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -5.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

9 Mbits/s RMS EVM

Sets 9 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M9 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M9? |
| Example | CALC:EVM:LIM:RMS:M9 -20 CALC:EVM:LIM:RMS:M9? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -8.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

12 Mbits/s RMS EVM

Sets 12 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M12 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M12? |
| Example | CALC:EVM:LIM:RMS:M12 -20 CALC:EVM:LIM:RMS:M12? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -10.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

18 Mbits/s RMS EVM

Sets 18 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M18 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M18? |
| Example | CALC:EVM:LIM:RMS:M18 -20 CALC:EVM:LIM:RMS:M18? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -13.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

24 Mbits/s RMS EVM

Sets 24 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|----------|--------------------|
|----------|--------------------|

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M24 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M24? |
| Example | CALC:EVM:LIM:RMS:M24 -20 CALC:EVM:LIM:RMS:M24? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -16.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

36 Mbits/s RMS EVM

Sets 36 Mbits/s RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:M36 <rel_ampl> :CALCulate:EVM:LIMit:RMS:M36? |
| Example | CALC:EVM:LIM:RMS:M36 -20 CALC:EVM:LIM:RMS:M36? |
| Notes | This limit value is used in 802.11a/g/j/p (OFDM 20M), 801.11g (DSSS-OFDM) |
| Preset | -19.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

Pilot Tracking

802.11 OFDM performs demodulation relative to the data in pilot carriers embedded in the signal. These pilot carriers replace data-carrying elements of the signal and allow some kinds of impairments to be removed or “tracked out”.

Many impairments will be common to all pilot carriers and can be measured and displayed as “common pilot error”.

In addition, several specific tracking functions can be individually switched on and off in the demodulation performed by this measurement. This is a very useful troubleshooting approach, since modulation errors can be examined with and without the benefit of particular types of pilot tracking.

| | |
|----------------------|-----------------------------|
| Key Path | Meas Setup, Advanced |
| Initial S/W Revision | A.10.01 |

Track Amplitude

Track Amplitude specifies whether the analyzer tracks amplitude changes in the pilot subcarriers. When Track Amplitude is selected, the analyzer applies pilot subcarrier amplitude error correction to the pilot and data subcarriers. This is in addition to Track Phase and Track Timing error correction, if selected.

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PILot:TRACk:AMPLitude OFF ON 0 1 :CALCulate:EVM:PILot:TRACk:AMPLitude? |
| Example | CALC:EVM:PIL:TRAC:AMPL 1 CALC:EVM:PIL:TRAC:AMPL? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TRACk:AMP OFF ON 0 1 [:SENSe] :EVM:TRACk:AMP? |
| Initial S/W Revision | A.10.01 |

Track Phase

The Track Phase parameter specifies whether the analyzer tracks phase changes in the pilot subcarriers. When Track Phase is selected, the analyzer applies pilot subcarrier phase error correction to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Timing error correction if selected.

| | |
|-----------------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PILot:TRACk:PHASe OFF ON 0 1 :CALCulate:EVM:PILot:TRACk:PHASe? |
| Example | CALC:EVM:PIL:TRAC:PHAS 0 CALC:EVM:PIL:TRAC:PHAS? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Track Timing

The Track Timing parameter specifies whether the analyzer tracks timing changes in the pilot subcarriers. When Track Timing is selected the analyzer applies pilot subcarrier timing error correction (frequency offset correction) to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Phase error correction if selected.

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PILot:TRACk:TIMing OFF ON 0 1 :CALCulate:EVM:PILot:TRACk:TIMing? |
| Example | CALC:EVM:PIL:TRAC:TIM 1 CALC:EVM:PIL:TRAC:TIM? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TRACk:TIMing |
| Initial S/W Revision | A.10.01 |

Sync Training Sequence

This parameter specifies synchronization method to use when synchronizing to the start of the OFDM burst.

A value of Short means to search for and synchronize to an 802.11a/g/j/p (OFDM) preamble short symbol sequence.

A value of Long means to search for and synchronize to an 802.11a/g (OFDM) preamble long symbol sequence (also called the channel estimation sequence).

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, More, Advanced |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:STSequence LONG SHORT [:SENSe] :EVM:STSequence? |
| Example | EVM:STS LONG EVM:STS? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) measurement, otherwise it will be grayed out. Forceful message “-221 Setting Conflict, Sync Training Sequence is not available for current Radio Setting” |
| Preset | SHORT |
| State Saved | Saved in instrument state. |
| Backwards Compatibility SCPI | [:SENSe] :EVM:SYNCseq LONG SHORT [:SENSe] :EVM:SYNCseq? |
| Initial S/W Revision | A.10.01 |

Equalizer Training

This specifies how the equalizer is initialized, or “trained”. The valid values are Channel Estimation Seq Only and Channel Estimation Seq & Data. The value Channel Estimation Seq Only, which is the default, specifies that the equalizer is trained using only the channel estimation sequence (also called the “long sync”) portion of the burst preamble. The 802.11a/g/n standards imply that the equalizer should be implemented this way when measuring EVM, and this matches how a real receiver would probably implement an equalizer.

The value and Channel Estimation Seq & Data specifies that the equalizer should be trained using both the channel estimation sequence and the entire data portion of the burst. This usually gives a more accurate estimate of the equalizer response. It also typically lowers the EVM by between one and three dB.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:EQUalizer:TMODe SEQuence SDATa :CALCulate:EVM:EQUalizer:TMODe? |
| Example | CALC:EVM:EQU:TMOD SDAT CALC:EVM:EQU:TMOD? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | SEQ |

| | |
|-------------------------------------|--|
| State Saved | Saved in instrument state. |
| Range | Channel Est Seq Only Channel Est Seq&Data |
| Readback Text | Channel Est Seq Only Channel Est Seq & Data |
| Backwards Compatibility SCPI | [:SENSe] :EVM:EQualizer:TRaining SEQUence SDATa |
| | [:SENSe] :EVM:EQualizer:TRaining? |
| Initial S/W Revision | A.10.01 |

I/Q Normalize

This parameter specifies if the I/Q signals will be normalized.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:IQNorm OFF ON 0 1 :CALCulate:EVM:IQNorm? |
| Example | CALC:EVM:IQN ON CALC:EVM:IQN? |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:IQNorm OFF ON 0 1 [:SENSe] :EVM:IQNorm? |
| Initial S/W Revision | A.10.01 |

I/Q Compensation

This parameter allows to turn On or Off the compensation for IQ Gain Imbalance, IQ Quadrature Error, and IQ Timing Skew found in the input signal.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Advanced, More |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:COMPensate OFF ON 0 1 [:SENSe] :EVM:COMPensate? |
| Example | EVM:COMP ON EVM:COMP? |
| Notes | If the Radio Std is not 802.11 n, it will be grayed out .Forceful message “-221 Setting conflict, IQ Compensation is not available for current Radio Setting” |
| Preset | Off |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Spectrum

Sets a spectrum to either normal or to inverted for demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

The invert function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or a low side mix.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Advanced, More |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SPECTrum INVert NORMal :CALCulate:EVM:SPECTrum? |
| Example | CALC:EVM:SPEC INV CALC:EVM:SPEC? |
| Preset | NORMal |
| State Saved | Saved in instrument state. |
| Range | Normal Invert |
| Backwards Compatibility SCPI | [:SENSe] :EVM:MIRRorspec OFF ON 0 1 [:SENSe] :EVM:MIRRorspec? |
| Initial S/W Revision | A.10.01 |

Frequency Sync

Frequency Sync setting determines which portion of data is used for carrier frequency offset estimation in modulation analysis.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:FREQuency:SYNC PPILot PPData PREamble [:SENSe] :EVM:FREQ:SYNC? |
| Example | EVM:FREQ:SYNC PPIL EVM:FREQ:SYNC? |
| Preset | PPILot |
| State Saved | Saved in instrument state. |
| Readback Text | Preamble & Pilot Pre., Pilot & Data Preamble |
| Initial S/W Revision | 15.0 |

Meas Preset

Returns parameters for the current measurement to those set by the factory.

| | |
|----------------------|-------------------------|
| Key Path | Meas Setup, More |
| Mode | WLAN |
| Remote Command | :CONFigure:EVM |
| Example | CONF:EVM |
| Initial S/W Revision | A.10.01 |

Filter

Accesses Filter settings. These settings are used only for 802.11b/g (DSSS/CCK/PBCC) standard.

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

Reference Filter

This parameter controls the reference filter type used when computing the reference data for computing EVM

| | |
|----------------------|--|
| Key Path | Meas Setup, Filter |
| Remote Command | [:SENSe] :EVM:FILTer:REFeRence:TYPE GAUSSian RECT RC [:SENSe] :EVM:FILTer:REFeRence:TYPE? |
| Example | EVM:FILT:REF:TYPE GAUS EVM:FILT:REF:TYPE? |
| Notes | Only used in 802.11b/g (DSSS/CCK/PBCC) measurement |
| Preset | RECT |
| State Saved | Saved in instrument state. |
| Range | Gaussian Rect Raised Cosine |
| Readback Text | Gaussian Rect Raised Cosine |
| Initial S/W Revision | A.10.01 |

Alpha/BT

This parameter is used only when the Reference Filter is set to “GAUSSIAN” or “Raised Cosine”, or the Measurement filter is set to “RRC”. In these cases, this parameter controls the bT value for the Gaussian filter and alpha values for Raised Cosine and RRC filters.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Filter |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :EVM:FILTer:ALPHa <real></code> <code>[:SENSe] :EVM:FILTer:ALPHa?</code> |
| Example | EVM:FILT:ALPH 0.5 EVM:FILT:ALPH? |
| Notes | Only be available in 802.11 b/g (DSSS/CCK/PBCC) measurement |
| Couplings | Max Value is coupled with Reference Filter |
| Preset | 0.50 |
| State Saved | Saved in instrument state. |
| Min | 0.05 |
| Max | When Reference Filter is set to Gaussian:100.00 When Reference Filter is set to Raised Cosine: 1.00 |
| Backwards Compatibility SCPI | <code>[:SENSe] :EVM:FILTer:BT <real></code> <code>[:SENSe] :EVM:FILTer:BT?</code> |
| Initial S/W Revision | A.10.01 |

Measurement Filter

This parameter controls the measurement filter type used for computing EVM.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Filter |
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :EVM:FILTer:MEASurement:TYPE NONE RRC</code> <code>[:SENSe] :EVM:FILTer:MEASurement:TYPE?</code> |
| Example | EVM:FILT:MEAS:TYPE RRC EVM:FILT:MEAS:TYPE? |
| Notes | Only be available in 802.11 b/g (DSSS/CCK/PBCC) measurement |
| State Saved | Saved in instrument state. |
| Range | None RRC |
| Initial S/W Revision | A.10.01 |

Mode

See "[Mode](#)" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1918 for more information.

| | |
|-------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPle ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODes | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPUt | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGN | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Displays the Peak Search menu and places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

| | |
|-----------------------------|--|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum |
| Example | CALC:EVM:MARK2:MAX |
| Initial S/W Revision | Prior to A.02.00 |

Next Peak

Moves the selected marker to the peak that has the next highest amplitude that is less than the marker's current value.

| | |
|-----------------------------|---|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:NEXT |
| Example | CALC:EVM:MARK2:MAX:NEXT |
| Initial S/W Revision | Prior to A.02.00 |

Next Pk Right

Moves the selected marker to the next peak to the right of the current marker.

| | |
|-----------------------------|--|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:RIGHT |
| Example | CALC:EVM:MARK2:MAX:RIGH |
| Initial S/W Revision | Prior to A.02.00 |

Next Pk Left

Moves the selected marker to the next peak to the left of the current marker.

| | |
|-----------------------|---|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:LEFT |

| | |
|----------------------|-------------------------|
| Example | CALC:EVM:MARK2:MAX:LEFT |
| Initial S/W Revision | Prior to A.02.00 |

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. This sets the control mode for the selected marker to Delta mode. The softkey enables you to conveniently perform a peak search and change the marker's control mode to Delta without having to access two separate menus.

| | |
|----------------------|--------------------|
| Key Path | Peak Search |
| Initial S/W Revision | Prior to A.02.00 |

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

| | |
|-----------------------|--|
| Key Path | Peak Search, More |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:PTPeak |
| Example | CALC:EVM:MARK:PTP |
| Notes | Turns on the Marker Δ active function. |
| Dependencies | This key is not available when Coupled Markers is on. |
| Initial S/W Revision | Prior to A.02.00 |

Min Search

Moves the selected marker to the minimum y-axis value of the current trace.

| | |
|-----------------------|--|
| Key Path | Peak Search, More |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MINimum |
| Example | CALC:EVM:MARK:MIN |
| Initial S/W Revision | Prior to A.02.00 |

Print

See "Print " on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode’s settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled State Register <register number>” is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 1928.

| Key Path | Recall |
|-----------------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In**: path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|--|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|----------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data\masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data\masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMoRY:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1936

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|-----------------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

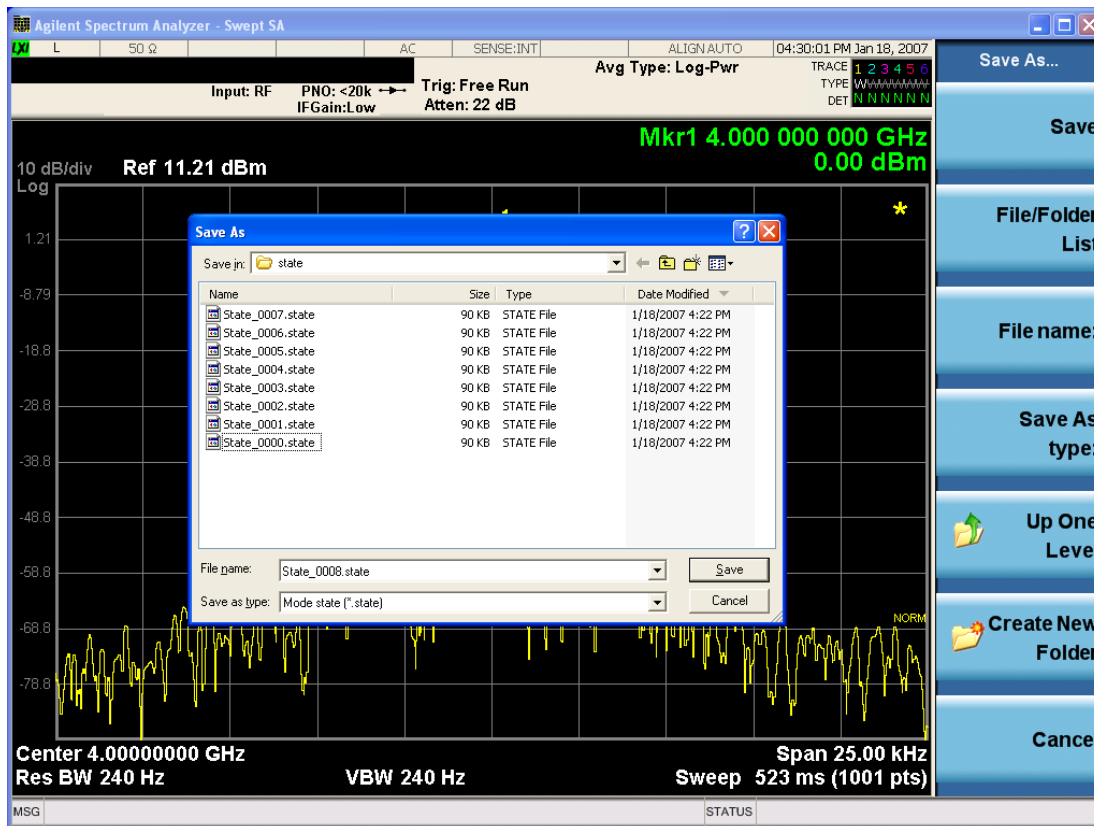
| | |
|-----------------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMoRY:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See "[More Information](#)" on page 1941

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

| | |
|----------------------|--|
| | The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Remove Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:RDIRECTory <directory_name> |
| Notes | The string must be a valid logical path. Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed. This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|-----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Remote Command | :MMEM:STOR:SEQuences: SLIST ALIST SAAList SSTep "MySequence.txt" |
| Example | :MMEM:STOR:SEQ:SLIST "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|----------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "To File . . ." on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

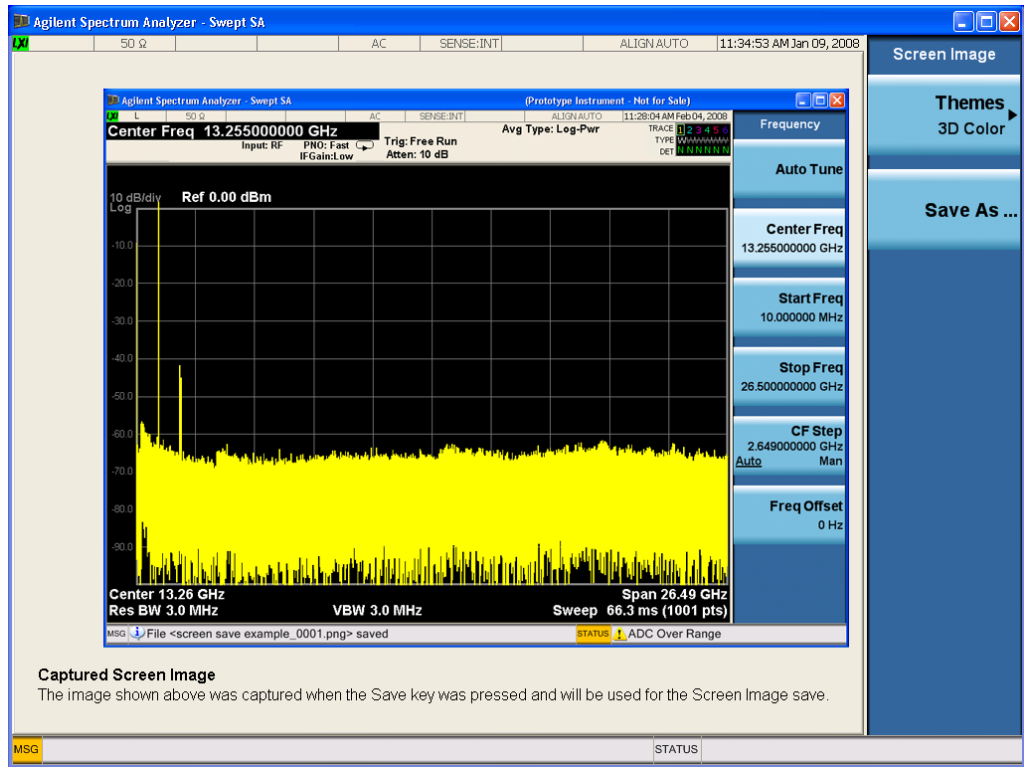
| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 1953

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------------|---|
| Remote Command | :OUTPut[:EXTErnal][:STATe] ON OFF 1 0 :OUTPut[:EXTErnal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|-----------------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 1956](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1956 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1956 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| | |
|----------------------|---|
| Key Path | Source, Amplitude |
| Dependencies | This key is unavailable, and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: **"GSM/EDGE Channel Number Ranges" on page 1960**,

"W-CDMA Channel Number Ranges" on page 1961, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1962, and "LTE FDD Channel Number Ranges" on page 1964.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| Band IX | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| Band X | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| | | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | Downlink | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| Band XI | Uplink | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| | | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Downlink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| | | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| Band XII | Uplink | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| Band XIII | Uplink | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| Band XIV | Uplink | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | Downlink | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| | | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| Band XIX | Uplink | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | Downlink | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |
| | | | |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 * N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | | 2110 | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | | 1930 | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | | 1805 | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | | 2110 | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | | 869 | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | | 875 | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | | 2620 | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | | 925 | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | | 1844.9 | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | | 2110 | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | | 1475.9 | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | | 729 | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | | 746 | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | | 758 | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | | 734 | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | | 860 | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 – 6149 | 830 | 24000 | 24000 – 24149 |
| 20 | 791 | 6150 | 6150 – 6449 | 832 | 24150 | 24150 – 24449 |
| 21 | 1495.9 | 6450 | 6450 – 6599 | 1447.9 | 24450 | 24450 – 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 – 8039 | 1626.5 | 25700 | 25700 – 26039 |
| 25 | 1930 | 8040 | 8040 – 8689 | 1850 | 26040 | 26040 – 26689 |
| 26 | 859 | 8690 | 8690 – 9039 | 814 | 26690 | 26690 – 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 – 36199 | 1900 | 36000 | 36000 – 36199 |
| 34 | 2010 | 36200 | 36200 – 36349 | 2010 | 36200 | 36200 – 36349 |
| 35 | 1850 | 36350 | 36350 – 36949 | 1850 | 36350 | 36350 – 36949 |
| 36 | 1930 | 36950 | 36950 – 37549 | 1930 | 36950 | 36950 – 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|---------------|
| 37 | 1910 | 37550 | 37550 - 37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 - 38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 - 38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 - 39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900-1920 MHz | 9504 to 9596 |
| | 2010-2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850-1910 MHz | 9254 to 9546 |
| | 1930-1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910-1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570-2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300-2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880-1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|----------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting " Sequencer " on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting " Sequencer " on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If " Real-Time AWGN " on page 2546 AWGN State is On and this setting is On, " RF Power " on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by " Power Control Mode " on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|---|
| | <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm" |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGLE SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613.](#)

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540.](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command :SOURCE:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 2018](#) "For Setup SCPI".)

 :SOURCE:RADio:ARB:SEQuence[:MWAveform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 2019](#) below.)

Example For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1 M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1. wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
If the waveform sequence file name is empty, an error is generated.
If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
|----------|--|

| | |
|-------|--------------------------------------|
| Notes | No remote command, front panel only. |
|-------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
|----------|--------------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
|----------|--|

| | |
|--------------|---|
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
|--------------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|----------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|--|
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int> |
| Example | SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Dependencies | This key is only available if the currently selected slot is in the trial state or the lock required state. |
| Initial S/W Revision | A.05.00 |

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

| | |
|----------------|--|
| Remote Command | :SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int> |
| Example | :SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked" |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an |

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"> |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated.and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|-----------------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURCE:LIST:NUMBER:STEPS <integer> :SOURCE:LIST:NUMBER:STEPS? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTernal EXTernal2 KEY BUS EXTernal4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTernal4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|--|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:DEFault:DIRectory <string>
 :SOURce:RADio:ARB: DEFault:DIRectory?

Example :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"
 :SOUR:RAD:ARB:DEF:DIR?

State Saved Persistent, survives a power cycle and a preset but not saved in the instrument state

Initial S/W Revision A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMediate INTernal KEY BUS EXTernal2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|----------|---|
| R | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... |
| e | :SOURce:LIST:SETup:RADio:BAND? |
| m | |
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| a | |
| n | |
| d | |
| E | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM |
| X | :SOUR:LIST:SET:RAD:BAND? |
| a | |
| m | |
| p | |
| l | |

e

N The command is to setup below parameter array of whole list sequence.

O Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591.

t If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on
e page 2587.

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFfrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFfrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|--|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTInuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

| | |
|----------------------|--|
| | see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount? |
| Example | :SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC? |
| Notes | The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 2616 and "Play Count" on page 2617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 2616 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #" |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ? |
| Example | :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 2618 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in |

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
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| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
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| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
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| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

SPAN X Scale

Accesses the SPAN/X Scale menu that allows you to set the desired horizontal scale settings.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Sweep/Control

Accesses a menu that allows you to select parameters that affect the sweep of the displayed measurement signal.

Only the Pause/Resume key is available.

See "[Sweep/Control](#)" on [page 2634](#) for more information.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:PAUSE |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:RESume |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

System

See ["System" on page 278](#)

Trace/Detector

There is no 'Trace/Detector' functionality supported in Modulation Analysis so this front-panel key will display a blank softkey when pressed.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See "Trig Delay " on page 350

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1255

RF Burst

See "RF Burst " on page 1267

Absolute Trigger

See "Absolute Trigger Level" on page 1268

Relative Trigger

See "Relative Trigger Level" on page 1257

Trig Slope

See "Trigger Slope " on page 1269

Trig Delay

See "Trig Delay " on page 354

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1259

Period

See "Period " on page 1260

Offset

See "Offset " on page 1261

Offset Adjust (Remote Command Only)

See "Offset Adjust (Remote Command Only)" on page 1262

Reset Offset Display

See "Reset Offset Display " on page 1263

Sync Source

See "Sync Source " on page 1263

Off

See "Off " on page 1264

External 1

See "[External 1](#)" on page 1264

Trigger Level

See "[Trigger Level](#)" on page 1264

Trig Slope

See "[Trig Slope](#)" on page 1265

External 2

See "[External 2](#)" on page 1265

Trigger Level

See "[Trigger Level](#)" on page 1266

Trig Slope

See "[Trig Slope](#)" on page 1267

RF Burst

See "[RF Burst](#)" on page 1267

Absolute Trigger

See "[Absolute Trigger Level](#)" on page 1268

Trig Slope

See "[Trigger Slope](#)" on page 1269

Trig Delay

See "[Trig Delay](#)" on page 365

Auto/Holdoff

See "[Auto/Holdoff](#)" on page 1270

Auto Trig

See "[Auto Trig](#)" on page 1270

Trig Holdoff

See "[Trig Holdoff](#)" on page 1271

Holdoff Type

See "[Holdoff Type](#)" on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses a menu that allows you to select from the following measurement view and display settings.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

This topic contains the following sections:

["Understanding Front Panel Results to Use Remote Commands" on page 2096](#)

["Front Panel Results" on page 2096](#)

["View Selection by Name" on page 2097](#)

["View Selection by number \(SCPI Only\)" on page 2098](#)

NOTE

The view setting options depend on the measurement view that is active.

Understanding Front Panel Results to Use Remote Commands

WLAN Modulation Analysis measurement has 7 views. They can be selected both by the front-panel and remotely (SCPI commands). View # and Window # in the table below are also used as subops of :DISPlay subsets, for example:

:DISPlay:EVM:VIEW2:WINDow3:TRACe:X:SCALE:PDIVision?

Denotes X Scale/Div value query of EVM trace (View # = 2, Window # = 3).

Front Panel Results

| View # | View | Number of Windows | Window # | Window |
|--------|--------------------------|-------------------|----------|---------------------------|
| [1] | I/Q Measured Polar Graph | 2 | [1] | Numeric Results |
| | | | 2 | I/Q Measured Polar Vector |
| 2 | I/Q Error (Quad View) | 4 | [1] | Magnitude Error |
| | | | 2 | Phase Error |
| | | | 3 | EVM |
| | | | 4 | Numeric Results |
| 3 | OFDM EVM (Quad View) | 4 | [1] | RMS EVM vs. Symbol |
| | | | 2 | RMS EVM vs. Carrier |
| | | | 3 | I/Q Measured Polar Vector |
| | | | 4 | Numeric Results |

| | | | | |
|---|------------------------------|---|-----|--------------------------------|
| 4 | Demod Bits | 1 | [1] | Demod Bits |
| 5 | Result Metrics | 1 | [1] | Result Metrics |
| 6 | Burst Info & HT-L Sig Info | 2 | [1] | Burst Info |
| | | | 2 | HT-Sig Info |
| 7 | Preamble Freq Error Vs. Time | 1 | [1] | Preamble Freq Error vs. Time |
| 8 | I/Q Impairments | 3 | [1] | IQ Gain Imbalance vs. Carrier |
| | | | 2 | IQ Quadrature Skew vs. Carrier |
| | | | 3 | IQ Time Skew vs. Carrier |

- POLar(1): I/Q Measured Polar Graph – Provides a combination view of an I/Q Measured Polar Vector graph and the Numeric Results data.
- IQERror(2): I/Q Error(Quad View) – Provides a combination view of a Magnitude Error, Phase Error, EVM window and Numeric Results for Direct Spread Freq Modulation
- OFDM(3): OFDM EVM (Quad View) – Provides a combination view of a RMS EVM vs. Subcarrier graph, RMS EVM vs. Symbol graph, I/Q Measured Polar Vector graph, and Numeric Results graph.
- DBITs(4): – Provides a window of demod bits
- NRESults(5): Result Metrics – Provides a summary for the measurement result and information
- BHTSiginfo (6): Burst Info Graph and HT-Sig Info Graph. Provides a summary view on Burst Info , HT-Sig Info and L-Sig Info.
- PFERror(7): Provides a Preamble Freq Error vs. Time graph, shows the total frequency error in Hz during the preamble part of the burst.
- IQIMpair (8): IQ Impairments (Triple View) – Provides a combination view of a IQ Gain Imbalance vs. Carrier graph IQ Quadrature Skew vs. Carrier graph and IQ Time Skew vs. Carrier graph.

View Selection by Name

Selects the current active view

| | |
|---|---|
| KEY:IQ Measured Polar Graph SCPI:POLar | To view I/Q Symbol Constellation graph and the summary data |
| KEY:I/Q Error SCPI:IQERror | To view Magnitude Error, Phase Error, EVM and Numeric Summary data |
| KEY:OFDM EVM SCPI:OFDM | To view RMS EVM vs. Symbol, RMS EVM vs. Carrier, I/Q Measured Polar Vector and Numeric Summary data |
| KEY:Demod Bits SCPI:DBITs | To view all the demoded bits of data |

| | |
|--|--|
| KEY:Numeric Results SCPI:NRESults | To view a summary for the measurement result and information |
| KEY:Burst Info & HT-Sig Info SCPI:BHTSiginfo | To view a summary on Burst Info, HT-Sig Info and L-Sig Info. |
| KEY:Preamble Freq Error vs. Time SCPI:PFERror | To view the total frequency error in the preamble part of the burst. |
| KEY:IQ Impairments SCPI:IQIMpair | To view the IQ impairments |

| Key Path | View/Display |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW[:SElect] POLar IQERror OFDM DBITs NRESults BHTSiginfo PFERror IQIMpair :DISPlay:EVM:VIEW[:SElect]? |
| Example | DISP:EVM:VIEW POL DISP:EVM:VIEW? |
| Couplings | If Radio Std is 802.11a/g (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz), 802.11n or 802.11ac IQ Error View will be grayed out, and if the customer selects this view by SCPI, an error “-211 Setting Conflict, I/Q Error is not available for current Radio Setting.” will be provided. If there is option x9077A-3FP or x9077A-4FP and Radio Std is not 802.11n or 802.11ac, Burst Info and HT-Sig Info will be grayed out, and if the customer selects this view by SCPI, an error “-211 Setting Conflict, Burst Info is not available for current Radio Setting.” Will be provided. |
| Preset | POLar |
| State Saved | Saved in instrument state. |
| Range | POLar IQERror OFDM DBITs NRESults BHTSiginfo PFERror IQIMpair |
| Initial S/W Revision | A.10.01 |

View Selection by number (SCPI Only)

The following remote command allows you to select the desired measurement view by number.

| | |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW:NSElect <integer> :DISPlay:EVM:VIEW:NSElect? |
| Example | DISP:EVM:VIEW:NSEL 1 DISP:EVM:VIEW:NSEL? |

| | |
|----------------------|---|
| Couplings | :DISP:EVM:VIEW[:SEL] and :DISP:EVM:VIEW:NSEL shall be synchronized with each other. If Radio Std is 802.11a/g (OFDM), 801.11g (DSSS-OFDM), 802.11n or 802.11ac, View2 (I/Q Error) will be grayed out, and if the customer selects this view by SCPI, an error “-211 Setting Conflict, I/Q Error is not available for current Radio Setting.” will be prompted. If Radio Std is NOT 802.11n or 802.11ac, View6 (Burst Info & HT-Sig Info) will be grayed out, and if the customer selects this view by SCPI, an error “-211 Setting Conflict, Burst Info is not available for current Radio Setting.” Will be prompted. If Radio Std is NOT 802.11n or 802.11ac, View8 (I/Q Impairments) will be grayed out, and if the customer selects this view by SCPI, an error “-211 Setting Conflict, I/Q Impairments is not available for current Radio Setting.” will be returned. |
| Preset | 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 8 |
| Initial S/W Revision | A.10.01 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

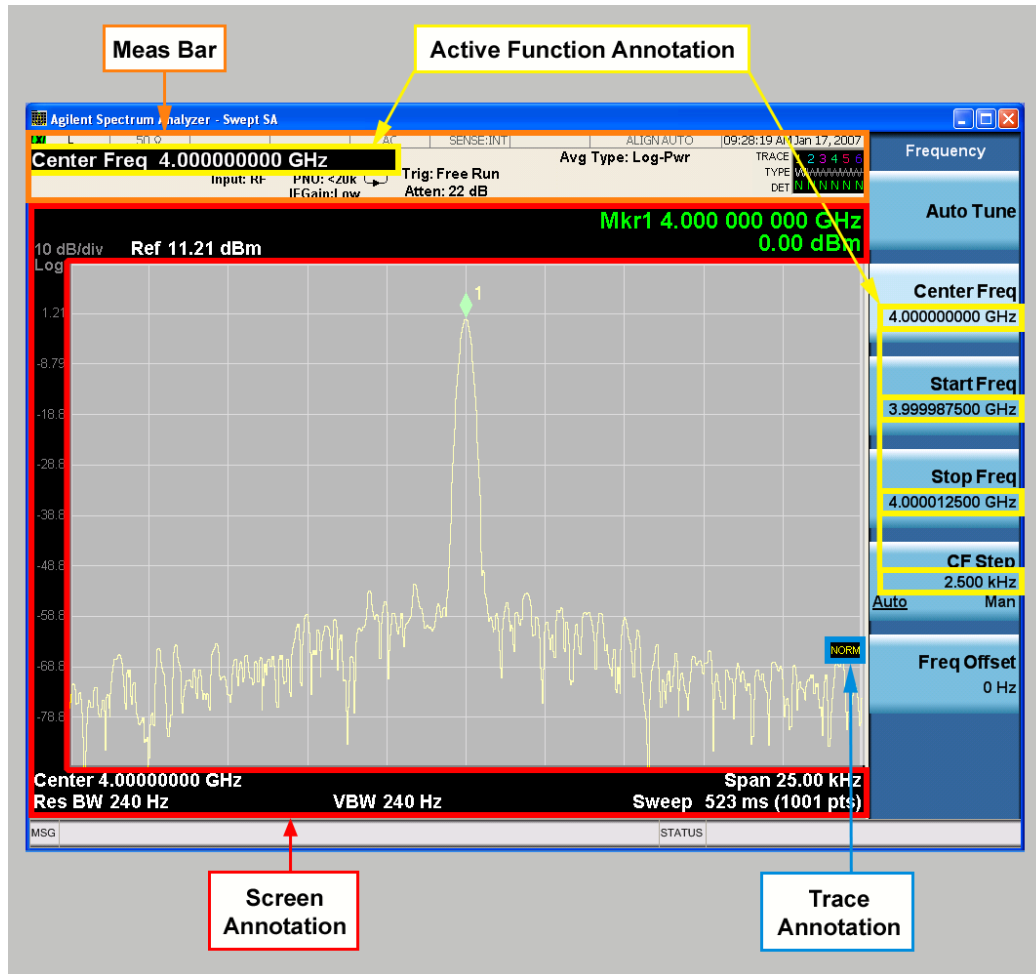
Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.

13 WLAN Modulation Analysis measurement
View/Display



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

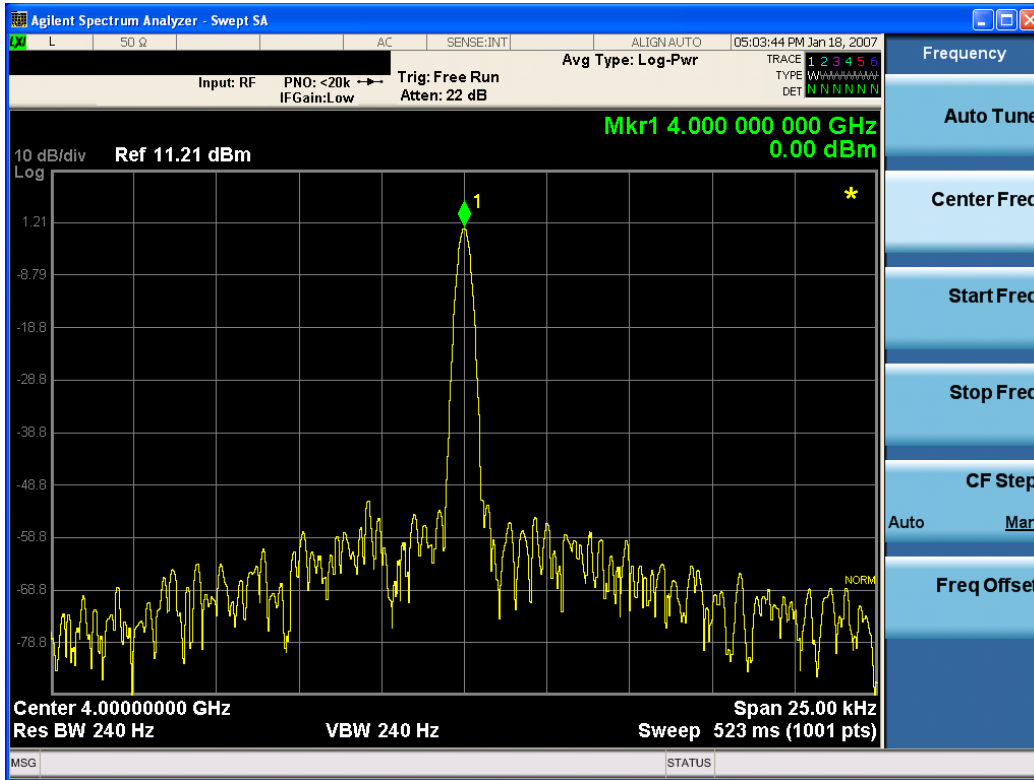
| | |
|-----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

13 WLAN Modulation Analysis measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|----------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|----------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

IQ Measured Polar Vector

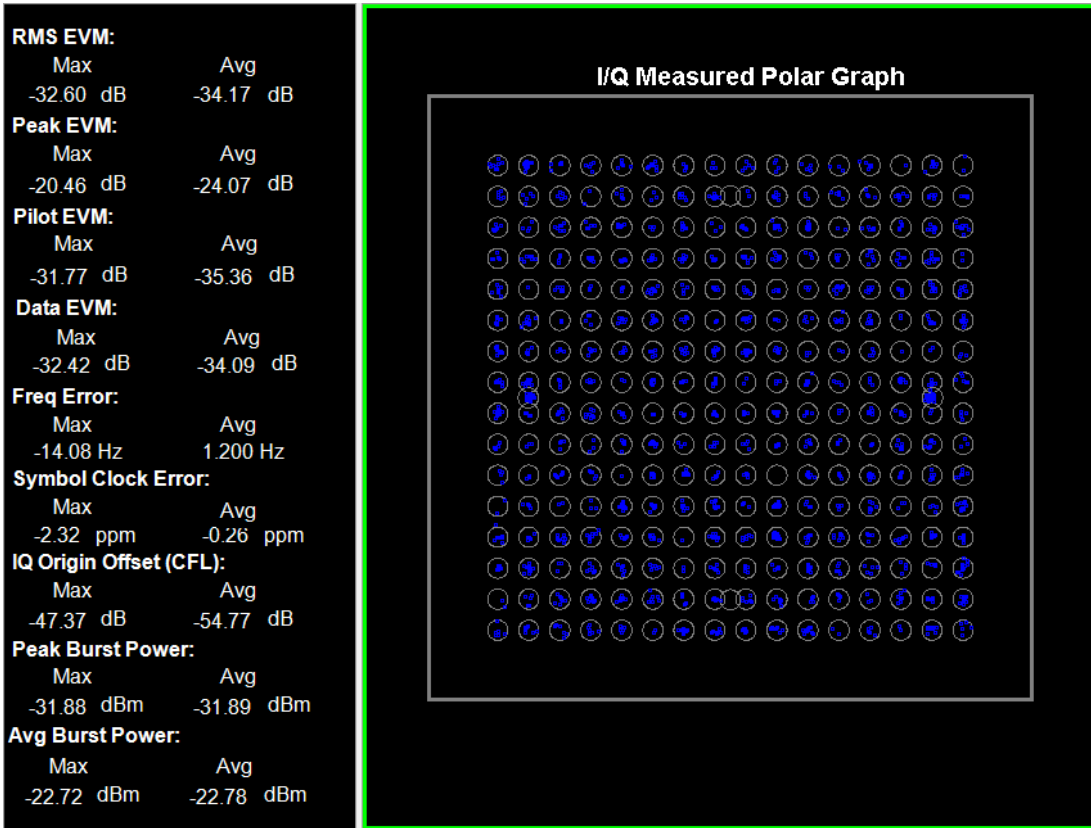
The following figure shows I/Q Measured Polar Vector view image. The window 2 (left window) shows metrics summary and the window 1 (right) shows I/Q measured polar vector graph.

The view consists of the following windows:

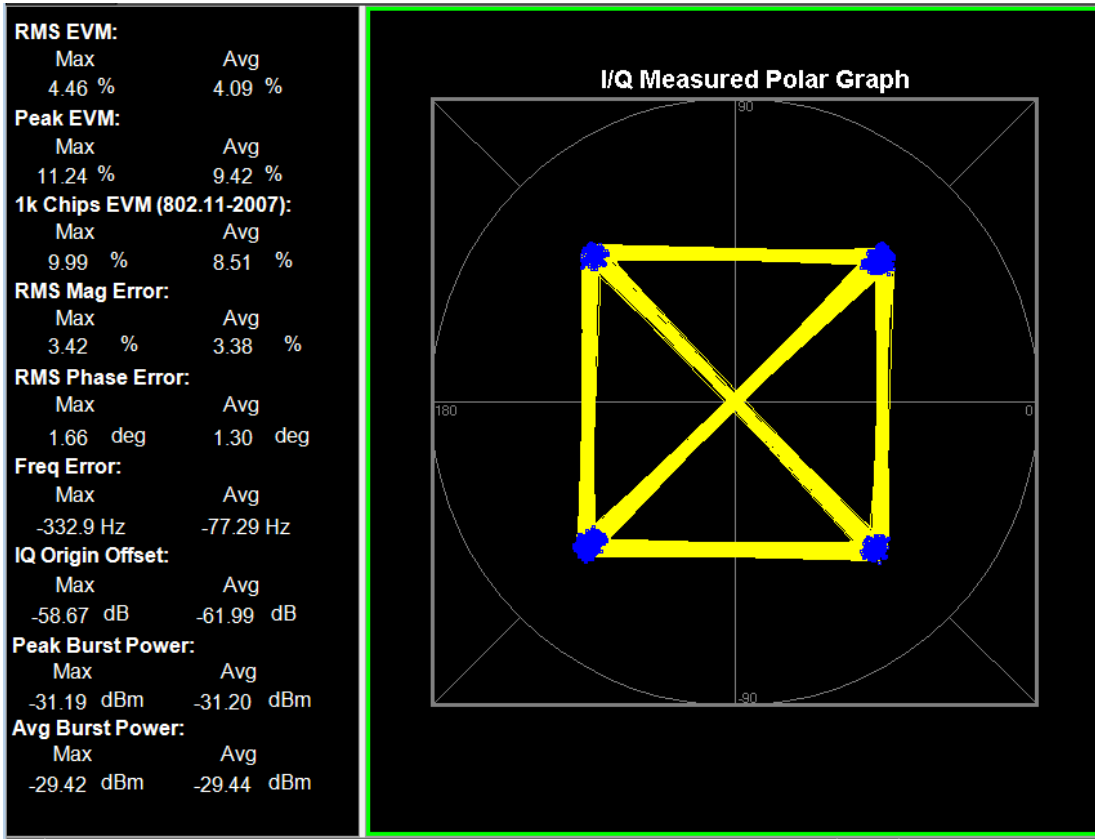
["I/Q Polar Vec/ConstIn" on page 2111](#)

["I/Q Symbol Constellation Window" on page 2108](#)

If Radio Standard is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac or 802.11ah:



If Radio Standard is 802.11b/g:



Numeric Results Window

“Avg” means the average of the individual measurements when averaging is on.
 “Max” means the maximum of the individual measurements when averaging is on.
 “Min” means the minimum of the individual measurements when averaging is on.

I/Q Symbol Constellation Window

| | |
|---------------------|---|
| Marker Operation | Yes [Symbol or Chip - (X,Y)] |
| Corresponding Trace | Corrected measured trace (n=7) This trace is affected by I/Q Meas Polar view setting parameters. |

When Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah

| Name | Corresponding Results | Description | Unit | Format |
|--------------|-----------------------|-----------------------------------|------|----------|
| RMS EVM Max | n=1 1st | RMS EVM over the measurement area | dB | ##.## dB |
| RMS EVM Avg | n=1 2nd | | dB | ##.## dB |
| Peak EVM Max | n=1 3rd | peak EVM in the | dB | ##.## dB |

| measurement area. | | | | |
|-------------------------------|----------|---|---------|---------------|
| Peak EVM Avg | n=1 4th | | dB | ##.## dB |
| Max Peak EVM Index | n=1 5th | | None | ## |
| Peak EVM Index | n=1 6th | | None | ## |
| Frequency Error Max | n=1 7th | the frequency error in the measured signal. | Hz | ##.## Hz |
| Frequency Error Avg | n=1 8th | | Hz | ##.## Hz |
| Symbol Clock Error Max | n=1 11th | symbol clock error | ppm | ##.## ppm |
| Symbol Clock Error Avg | n=1 12th | | ppm | ##.## ppm |
| I/Q Origin Offset Max | n=1 13th | the I and Q error (magnitude squared) offset from the origin. | dB | ##.## dB |
| I/Q Origin Offset Avg | n=1 14th | | dB | ##.## dB |
| Gain Imbalance Max | n=1 15th | the I/Q gain imbalance of the input signal | None | ##.## |
| Gain Imbalance Avg | n=1 16th | | None | ##.## |
| Quadrature error Max | n=1 17th | the I/Q quadrature error of the input signal | degrees | ##.## degrees |
| Quadrature error Avg | n=1 18th | | degrees | ##.## degrees |
| Avg Burst Power | n=1 19th | | dBm | ##.## dBm |
| Peak Burst Power | n=1 20th | | dBm | ##.## dBm |
| Peak-to-Avg Burst Power Ratio | n=1 21st | | None | ##.## |

When Radio Std is 802.11b/g (DSSS/CCK/PBCC):

| Name | Corresponding Results | Description | Unit | Format |
|--------------|-----------------------|-----------------------------------|------|---------|
| RMS EVM Max | n=1 1st | RMS EVM over the measurement area | % | ##.## % |
| RMS EVM Avg | n=1 2nd | | % | ##.## % |
| Peak EVM Max | n=1 3rd | peak EVM in the | % | ##.## % |

| measurement area. | | | | |
|---|----------|---|------|-----------|
| Peak EVM Avg | n=1 4th | | % | ##.## % |
| 1000chips Peak EVM (802.11- 2007) Max | n=1 19th | 1000 chips peak EVM in the measurement area. | % | ##.## % |
| 1000 chips Peak EVM (802.11- 2007) Avg | n=1 20th | | % | ##.## % |
| RMS Magnitude Error Max | n=1 21st | RMS magnitude error over the measurement area | % | ##.## % |
| RMS Magnitude Error Avg | n=1 22nd | | % | ##.## % |
| Peak Magnitude Error Max | n=1 23rd | peak magnitude error over the measurement area | % | ##.## % |
| Peak Magnitude Error Avg | n=1 24th | | % | ##.## % |
| RMS Phase Error Max | n=1 27th | RMS phase error over the measurement area | % | ##.## % |
| RMS Phase Error Avg | n=1 28th | | % | ##.## % |
| Peak Phase Error Max | n=1 29th | peak phase error over the measurement area | % | ##.## % |
| Peak Phase Error Avg | n=1 30th | | % | ##.## % |
| Frequency Error Max | n=1 7th | the frequency error in the measured signal. | Hz | ##.## Hz |
| Frequency Error Avg | n=1 8th | | Hz | ##.## Hz |
| Chip clock error Max | n=1 11th | Chip clock error | ppm | ##.## ppm |
| Chip clock error Avg | n=1 12th | | ppm | ##.## ppm |
| I/Q Origin Offset Max | n=1 13th | the I and Q error (magnitude squared) offset from the origin. | dB | ##.## dB |
| I/Q Origin Offset Avg | n=1 14th | | dB | ##.## dB |
| Gain | n=1 15th | the I/Q gain imbalance of | None | ##.## |

| | | | | |
|-------------------------------|----------|--|---------|----------------|
| Imbalance Max | | the input signal | | |
| Gain Imbalance Avg | n=1 16th | | None | ###.## |
| Quadrature error Max | n=1 17th | the I/Q quadrature error of the input signal | degrees | ###.## degrees |
| Quadrature error Avg | n=1 18th | | degrees | ###.## degrees |
| Carrier suppression Min | n=1 33th | RF Carrier Suppression | dB | ###.## dB |
| Carrier suppression Avg | n=1 34th | RF Carrier Suppression | dB | ###.## dB |
| Avg Burst Power | n=1 35th | | dBm | ###.## dBm |
| Peak Burst Power | n=1 36th | | dBm | ###.## dBm |
| Peak-to-Avg Burst Power Ratio | n=1 37th | | None | ###.## |

| | |
|----------------------|---------------------|
| Key Path | View/Display |
| Initial S/W Revision | A.10.01 |

I/Q Polar Vec/ConstIn

Specifies the format of the Polar Vector graph display. You can select one of the following formats:

- Vec ConstIn (Vector and Constellation)
- Vector (Vector only)
- Constellation (Constellation only)

| | |
|-----------------------|---|
| Key Path | View/Display, I/Q Measured Polar Graph |
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:POLar VC VECTor CONSTIn :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:POLar? |
| Example | DISP:EVM:VIEW:WIND:TRAC:POL CONS DISP:EVM:VIEW:WIND:TRAC:POL? |
| Notes | Default Value is coupled with Radio Std |
| Dependencies | If Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah: |

| | |
|----------------------|--|
| | ,Vec&Constln and Vector keys are gray out Forceful message “-224 Illegal parameter, Vect&Constn is not available for current Radio Setting”, “-224 Illegal parameter, Vector is not available for current Radio Setting” |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah: CONS If Radio Std is 802.11b/g (DSSS/CCK/PBCC): VC |
| State Saved | Saved in instrument state. |
| Range | Vec & Constln Vector Constellation |
| Initial S/W Revision | A.10.01 |

I/Q Points

Specifies the number of I/Q Points displayed for the I/Q measured polar graph.

| | |
|----------------------|---|
| Key Path | View/Display, I/Q Measured Polar Graph |
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQPoints <integer> :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQPoints? |
| Example | DISP:EVM:VIEW:WIND:TRAC:IQP 10 DISP:EVM:VIEW:WIND:TRAC:IQP? |
| Notes | Default, Max values are coupled with Radio Std and Meas Interval |
| Couplings | Change the Meas Interval will set the I/Q Points as the same number as Meas Interval when Meas Interval is no bigger than 24564, otherwise, it will be clipped to 24564 |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah: 60 symbols If Raideo Std is 802.11b/g (DSSS/CCK/PBCC): 2794 chips |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | Meas Interval, when Meas Interval <= 24564 24564, when Meas Interval > 24564 |
| Initial S/W Revision | A.10.01 |

I/Q Points Offset

Specifies the number of points offset from the first one in the Meas Interval.

| | |
|----------------|---|
| Key Path | View/Display, I/Q Measured Polar Graph |
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQOffset <integer> |

| | |
|----------------------|--|
| | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:IQOffset? |
| Example | DISP:EVM:VIEW:WIND:TRAC:IQOF 10 DISP:EVM:VIEW:WIND:TRAC:IQOF? |
| Notes | Max Value is coupled with Meas Interval and I/Q Points |
| Couplings | Change of Meas Interval will set the I/Q Points Offset to be 0 |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | Meas Interval - I/Q Points |
| Initial S/W Revision | A.10.01 |

I/Q Rotation

Toggles the display rotation function between On and Off. If set to On, the I/Q polar vector or I/Q polar constellation graph is rotated from 0 to 359.5 degrees.

| | |
|-----------------------|--|
| Key Path | View/Display, I/Q Measured Polar Graph |
| Mode | WLAN |
| Remote Command | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation <real> :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation? :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:ROTation:STATE 0 1 OFF ON :DISPlay:EVM:VIEW[1]:WINDow1:TRACe:ROTation:STATE? |
| Example | DISP:EVM:VIEW:WIND:TRAC:ROT 45 DISP:EVM:VIEW:WIND:TRAC:ROT? |
| Preset | 45.0 ° OFF |
| State Saved | Saved in instrument state. |
| Min | 0 ° |
| Max | 359.5 ° |
| Initial S/W Revision | A.10.01 |

Full Vector

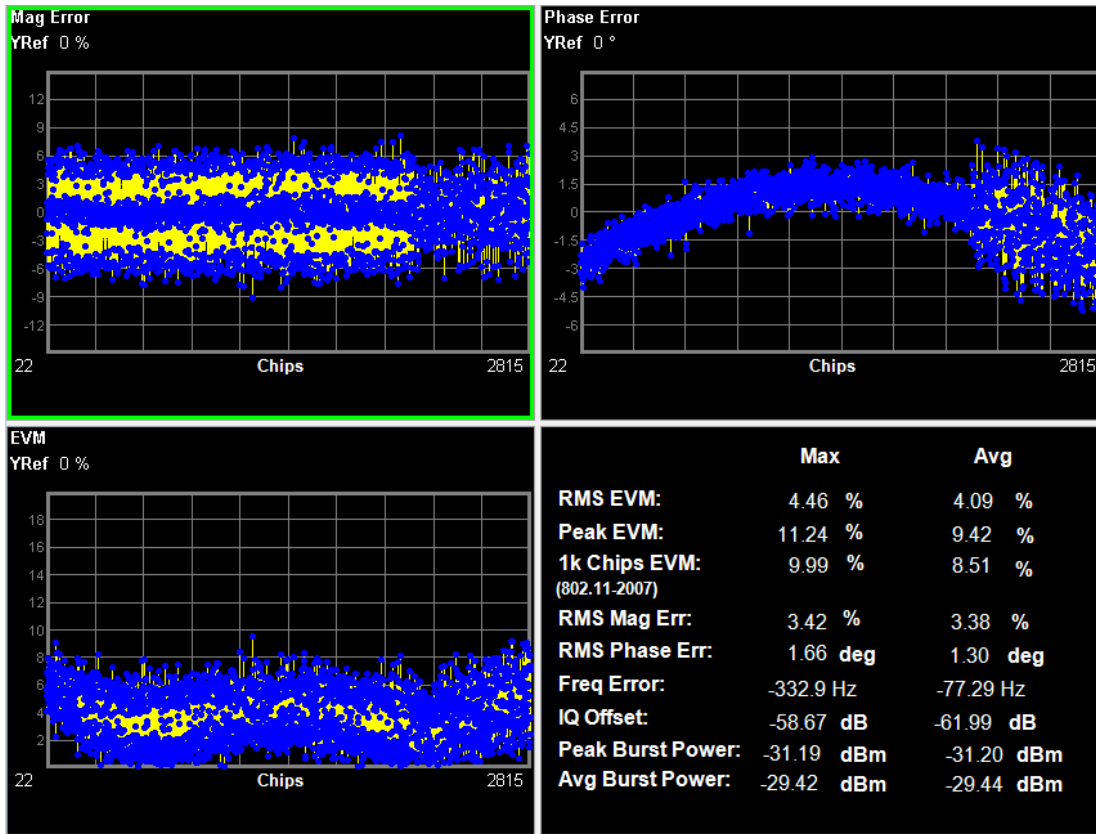
Toggles the full vector display function between On and Off. If set to On, the full vector traces, that are shown in gray, are displayed in the background of the polar vector solid traces, which are shown in yellow. Both traces can be interpolated by using the Interpolation key.

| | |
|----------|---|
| Key Path | View/Display, I/Q Measured Polar Graph |
| Mode | WLAN |

| | |
|-----------------------------|--|
| Remote Command | :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:FVEctor[:STATE] 0 1 OFF ON :DISPlay:EVM:VIEW[1]:WINDow[1]:TRACe:FVEctor[:STATE] ? |
| Example | DISP:EVM:VIEW:WIND:TRAC:FVEC ON DISP:EVM:VIEW:WIND:TRAC:FVEC? |
| Dependencies | Grayed out if the selected view is I/Q Measured Polar Graph and the selected I/Q Polar Vec/Constln is Constellation. Forceful message"-221 Setting conflict;Full vector is not available for Constellation only" |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

I/Q Error (Quad View)

The I/Q Error (Quad View) view consists of 4 windows.



"Mag Error Window" on page 2115

"Phase Error Window" on page 2115

"EVM Window" on page 2115

"Numeric Results Window" on page 2115

Mag Error Window

| | |
|---------------------|---------------------------|
| Marker Operation | Yes (Chips - Magnitude) |
| Corresponding Trace | n=5 Magnitude Error Trace |

Phase Error Window

| | |
|---------------------|-----------------------|
| Marker Operation | Yes (Chips - Phase) |
| Corresponding Trace | n=6 Phase Error Trace |

EVM Window

| | |
|---------------------|-------------------|
| Marker Operation | Yes (Chips - EVM) |
| Corresponding Trace | n=4 EVM trace |

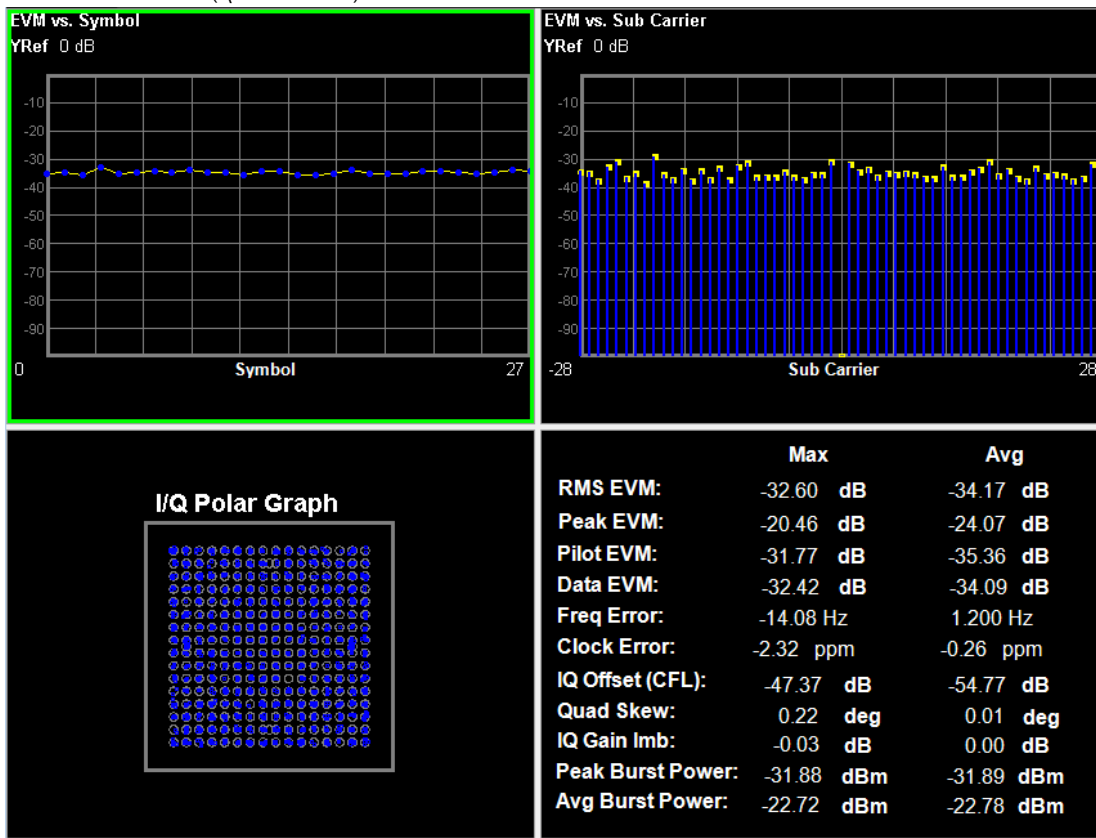
Numeric Results Window

| | |
|---------------------|-------|
| Marker Operation | No |
| Corresponding Trace | None. |

| | |
|----------------------|---------------------|
| Key Path | View/Display |
| Initial S/W Revision | A.10.01 |

OFDM EVM View

The OFDM EVM (Quad View) view consists of 4 windows.



EVM vs. Symbol Window

EVM vs. Carrier Window

IQ Measured Polar Window

Numeric Results Window

EVM vs. Symbol

Provides Magnitude EVM vs. Symbol results.

| | |
|---------------------|------------------------------|
| Marker Operation | Yes (Symbol – Magnitude EVM) |
| Corresponding Trace | n=2 EVM vs. Symbol Trace |

EVM vs. Carrier

Provides Magnitude EVM vs. Carrier results.

| | |
|---------------------|----------------------------------|
| Marker Operation | Yes (Subcarrier – Magnitude EVM) |
| Corresponding Trace | n=3 EVM vs. Carrier Trace |

I/Q Measured Polar

| | |
|---------------------|---|
| Marker Operation | Yes {Symbol or Chip – (X,Y)} |
| Corresponding Trace | Corrected measured trace (n=7) This trace is affected by I/Q Meas Polar view setting parameters. |

Numeric Results Window

| | |
|---------------------|-------|
| Marker Operation | No |
| Corresponding Trace | None. |

| | |
|----------------------|---------------------|
| Key Path | View/Display |
| Initial S/W Revision | A.10.01 |

I/Q Error

Selects the I/Q Error view.

There are four windows in this view:

- 1 "MER/EVM vs. Sub-carrier/Frequency Window" on page 2117 (top left)
- 2 "Logical Channel Window" on page 2118 (top right)
- 3 "Polar Graph Window" on page 2118 (bottom left)
- 4 "Result Metrics Window" on page 2118 (bottom right)

The Reference Value, Units per Division, and Reference Position of X or Y Axis in the trace graph can be adjusted by selecting SPAN X Scale or AMPTD Y Scale.

Figure - I/Q Error View of Modulation Accuracy Measurement

MER/EVM vs. Sub-carrier/Frequency Window

This window provides MER/EVM vs. Sub-carrier/Frequency results. It comprises the MER/EVM value of each sub-carrier/frequency in order to give the users a panorama of MER/EVM results. There are 3077 points in 8MHz mode.

| | |
|----------------------------|---|
| Marker Trace | Yes |
| Corresponding Trace | MER/EVM vs. Sub-carrier/Frequency trace (n=3) |

The top left window will be changed by Y Scale Type and X Scale Type.

If Y Scale Type is MER and X Scale Type is Carrier,

If Y Scale Type is EVM and X Scale Type is Carrier,

If Y Scale Type is MER and X Scale Type is Freq,

If Y Scale Type is EVM and X Scale Type is Freq,

Logical Channel Window

This window provides Logical Channel graph. It gives the TSO decoding results.

| Name | Corresponding Results | Format |
|--------|--|--|
| LCH | Physical Logical Channel (PLCH) type and index. PLCH includes one Control Logical Channel (CLCH) and multiple Service Logical Channels (SLCH). | |
| Range | Start timeslot and end timeslot for corresponding PLCH | |
| Mod | Modulation format for corresponding PLCH | BPSK, QPSK, 16QAM |
| RS | RS code rate for corresponding PLCH | (240, 240), (240, 224), (240,192), (240, 176) |
| LDPC | LDPC code rate for corresponding PLCH | ½, ¾ |
| Intlv | Byte interleaving type for corresponding PLCH | Mode 1, Mode 2, Mode 3 |
| Scramb | Scrambling type for corresponding PLCH | Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, Mode 5, Mode 6, Mode 7 |

Polar Graph Window

This window provides Polar Graph.

| Name | Corresponding Trace | Format |
|---------------|--|---------------|
| Constellation | The I/Q polar trace of measured input data. The length displayed is defined by I/Q Points.(n=2) | Constellation |

Result Metrics Window

This window provides Modulation Accuracy result metrics.

| Name | Corresponding Results | Format |
|----------|--|---------|
| EVM | n=1 1st EVM of the current symbols | 99.99 % |
| Peak EVM | n=1 2nd Peak EVM of the current symbols | 99.99 % |

| Name | Corresponding Results | Format |
|------------------|--|---------------|
| MER | n=1 4th MER of the current symbols | 99.99 dB |
| Peak MER | n=1 5th Peak MER of the current symbols | 99.99 dB |
| Mag Error | n=1 7th Mag Error of the current symbols | 99.99 % |
| Peak Mag Error | n=1 8th Peak Mag Error of the current symbols | 99.99 % |
| Phase Error | n=1 10th Phase Error of the current symbols | 99.99 deg |
| Peak Phase Error | n=1 11th Peak Phase Error of the current symbols | 99.99 deg |
| Amptd Imbalance | n=1 14th Amplitude imbalance of the current symbols | 99.9999 dB |
| Quad Err | n=1 15th Quadrature error of the current symbols | 99.9999 deg |
| Timing Skew | n=1 16th Timing skew of the current symbols | 9.9999E9 s |

| | |
|----------------------|---|
| Key Path | View/Display |
| Example | :DISPlay:EVM:VIEW IQERror :DISPlay:EVM:VIEW? |
| Initial S/W Revision | A.03.00 |

Prev Page

Moves the display one page back to the previous page of the Logical Channel window.

| | |
|----------------------|--------------------------------|
| Key Path | View/Display, I/Q Error |
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

Next Page

Moves the display one page forward to the next page of the Logical Channel window.

| | |
|----------------------|--------------------------------|
| Key Path | View/Display, I/Q Error |
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

Scroll Up

Moves one line upward from the current line of the Logical Channel window.

Pressing the up arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the up arrow hard key controls the active function, but has no effect on line movement.

| | |
|----------------------|--------------------------------|
| Key Path | View/Display, I/Q Error |
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

Scroll Down

Moves one line downward from the current line of the Logical Channel window.

Pressing the down arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the down arrow hard key controls the active function, but has no effect on line movement.

| | |
|----------------------|--------------------------------|
| Key Path | View/Display, I/Q Error |
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

First Page

Moves the display to the first page of the Logical Channel window.

| | |
|----------------------|--------------------------------|
| Key Path | View/Display, I/Q Error |
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

Last Page

Moves the display to the last page of the Logical Channel window.

| | |
|----------|--------------------------------|
| Key Path | View/Display, I/Q Error |
|----------|--------------------------------|

| | |
|----------------------|---------|
| Mode | CMMB |
| Initial S/W Revision | A.03.00 |

Result Metrics

Show following OFDM numeric results view if radio standard is If Radio Std is 802.11a/g/j/p (OFDM), 802.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah:

| | Max | | Avg | Limit |
|--------------------------------|------------|------------------|------------|-----------|
| RMS EVM: | -27.97 dB | | -29.16 dB | -30.00 dB |
| | 3.99 % | | 3.49 % | |
| Peak EVM: | -15.19 dB | at sym 6 | -19.65 dB | N/A |
| | 17.39 % | | 10.41 % | |
| Pilot EVM: | -27.01 dB | | -29.62 dB | N/A |
| | 4.46 % | | 3.31 % | |
| Data EVM: | -27.93 dB | | -29.14 dB | N/A |
| | 4.02 % | | 3.49 % | |
| Freq Error: | -0.06 ppm | | 0.00 ppm | 20.00 ppm |
| Symbol Clock Error: | 8.46 ppm | | 1.03 ppm | 20.00 ppm |
| IQ Origin Offset (CFL): | -45.96 dB | | -53.34 dB | -24.00 dB |
| Quadrature Skew: | -0.22 deg | | -0.04 deg | N/A |
| IQ Gain Imb: | -0.04 dB | | 0.00 dB | N/A |
| IQ Time Skew: | -93.77 ps | | -69.88 ps | N/A |
| <hr/> | | | | |
| Avg Burst Power: | -31.23 dBm | | -31.24 dBm | |
| Peak Burst Power: | -20.05 dBm | | -20.20 dBm | |
| Peak-to-Avg Pwr Ratio: | 11.2 dB | | 11.0 dB | |
| Modulation Format: | 256QAM | Bit Rate: | 351.0 Mbps | |

Show following DSSS numeric results view if radio standard is 802.11b\g (DSSS/CCK/PBCC).

| | Max (Min) | Avg | Limit |
|------------------------------------|------------------------|----------------------------|-----------|
| RMS EVM: | 3.92 % | 3.92 % | 16.0 % |
| Peak EVM: | 9.21 % at chip 2387 | 9.21 % | N/A |
| 1k Chips EVM (802.11-2007): | 7.86 % | 7.86 % | 35.0 % |
| RMS Magnitude Error: | 3.54 % | 3.54 % | N/A |
| Peak Magnitude Error: | 8.56 % at chip 2112 | 8.56 % | N/A |
| RMS Phase Error: | 0.97 deg | 0.97 deg | N/A |
| Peak Phase Error: | -5.10 deg at chip 2387 | -5.10 deg | N/A |
| Freq Error: | 0.00 ppm | 0.00 ppm | 25.00 ppm |
| Chip Clock Error: | 0.01 ppm | 0.01 ppm | 25.00 ppm |
| IQ Origin Offset: | -54.56 dB | -54.56 dB | N/A |
| Quadrature Skew: | -0.16 deg | -0.16 deg | N/A |
| IQ Gain Imb: | -0.05 dB | -0.05 dB | N/A |
| Carrier Suppression: | 45.56 dB | 45.56 dB | 15.00 dB |
| Avg Burst Power: | -31.36 dBm | -31.36 dBm | |
| Peak Burst Power: | -29.42 dBm | -29.42 dBm | |
| Peak-to-Avg Pwr Ratio: | 1.9 dB | 1.9 dB | |
| Modulation Format: | CCK11 | Bit Rate: 11.0 Mbps | |

| | |
|---------------------|---------------------------|
| Marker Operation | No |
| Corresponding Trace | n=1 Results Metrics trace |

| | |
|----------------------|--------------|
| Key Path | View/Display |
| Initial S/W Revision | A.10.01 |

Burst Info & HT-Sig Info

The following figure shows Burst Info & HT-Sig Info view image. The window Burst Info shows the information about the analysed burst. The window HT-Sig Info shows the decode info on HT-Sig and L-Sig.

| OFDM Data Burst Info: | | | | | |
|-----------------------|------------|----------|----------|---------|-------------------------|
| Burst Info Type | Mod Format | Len(sym) | Pwr(dBm) | EVM(dB) | Format: 20 MHz HT-mixed |
| L-STF | QPSK | 2 | -11.67 | -999.00 | Stream: 1 |
| L-LTF | BPSK | 2 | -11.67 | -999.00 | |
| L-SIG | BPSK | 1 | -11.47 | -7.02 | HT-SIG: CRCPassed |
| HT-SIG | BPSK | 2 | -11.66 | -7.36 | |
| HT-STF | QPSK | 1 | -11.46 | -999.00 | L-SIG: HdrStatErrBits |
| HT-LTF | BPSK | 1 | -11.82 | -999.00 | |
| HT-Data | 16QAM | 60 | -12.00 | -2.73 | |
| Total | Unknown | 69 | -11.95 | -2.87 | |

| OFDM HT-Sig Info | | | | | | |
|------------------|----|---------|-----------|--------|---------|--------------|
| MCS: | 3 | CBW: | 20MHz | HTLen: | 1058 | Smooth: N |
| Reserved: | 1 | Aggreg: | N | STBC: | 0 | FECCode: BCC |
| ExtStreams: | 0 | CRC: | 0x8a | Tail: | 0x0 | NotSnd: Y |
| ShortGI: | N | | | | | |
| OFDM L-Sig Info | | | | | | |
| Rate: | 48 | MBits/s | Reserved: | 1 | Len: | 1312 |
| | | | | | Parity: | 0 |
| | | | | | Tail: | 0x1 |

| Key Path | View/Display |
|----------------------|--------------|
| Initial S/W Revision | A.10.01 |

Burst Info Content

| Name | Description | Unit | Format |
|-----------------|---|------|--------|
| Burst Info Type | <p>It indicates the type of this piece of the input signal. It has 10 different values.</p> <p>L-STF/ HT-GF-STF: The first two symbols of any valid IEEE 802.11n signal will be an L-STF or HT-GF-STF.</p> <p>L-LTF: The second two symbols of a Non-HT (Legacy) Mode or HT-mixed Mode 802.11n signal will be an L-LTF.</p> <p>L-SIG: The fifth symbol of a Non-HT (Legacy) Mode or HT-mixed Mode 802.11n signal will be an L-SIG symbol.</p> <p>L-Data: A Non-HT (Legacy) Mode 802.11n signal contains L-Data symbols.</p> <p>HT-STF: An HT-mixed Mode 802.11n signal contains an HT-STF symbol.</p> <p>HT-LTF: HT-mixed Mode and HT-greenfield 802.11n signals both contain HT-LTF symbols, but they are found in different places in the</p> | None | None |

| | | | |
|------------|--|------|-----------|
| | <p>preamble.</p> <p>HT-SIG: HT-mixed Mode and HT-greenfield 802.11n signals both contain HT-SIG symbols, but they are found in different places in the preamble.</p> <p>HT-Data: HT-mixed Mode and HT-greenfield 802.11n signals both contain HT-Data symbols.</p> <p>Unknown: This means that the give information about a chunk of the input signal of unknown type</p> <p>All: This means that the give information that summaries the entire input signal.</p> | | |
| Mod Format | BPSK, QPSK, 16QAM, 64QAM, 256QAM, Unknown | None | None |
| Len | It is an integer used to description the symbol length the signal field or data field. | None | None |
| Pwr | It gives the average power level. | dBm | ##.## dBm |
| Evm | <p>It gives the RMS EVM level, dB, of the piece of the input signal that is described by the Burst Info Type.</p> <p>The EVM level is not defined on the training symbols of the preamble, so it is set to -999.0 if the burst info type L-STF, L-LTF, HT-STF HT-LTF and Unknown.</p> | dB | ##.## dB |
| Format | <p>This specifies which OFDM11n standard signal format was detected.</p> <p>20 MHz Non-HT: A Non-HT (Legacy) 20 MHz IEEE 802.11a signal was found.</p> <p>20 MHz HT-greenfield: An IEEE 802.11n HT-greenfield 20 MHz signal was found.</p> <p>20 MHz HT-mixed: An IEEE 802.11n HT-mixed Mode 20 MHz signal was found.</p> <p>40 MHz HT-greenfield: An IEEE 802.11n HT-greenfield 40 MHz signal was found.</p> <p>40 MHz HT-mixed: An IEEE 802.11n HT-mixed Mode 40 MHz signal was found.</p> <p>40 MHz Non-HT Duplicate: An IEEE 802.11n Non-HT Duplicate 40 MHz signal was found.</p> <p>Unknown: An invalid mode was detected.</p> | None | None |
| Stream | This gives the actual number of data streams that were analyzed. | None | None |
| HT-Sig | <p>The measurement demodulates and decodes the HT-SIG symbols found before the start of the data in many 802.11n signal formats, and this output variable gives the status of the HT-SIG demodulation. Possible values are:</p> <p>None: There aren't any HT-SIG symbols. This would happen if the input signal is a Non-HT (Legacy) or Non-HT Duplicate format signal.</p> <p>Unknown: Nothing is known about the HT-SIG symbols. This would happen if the input vector is so small that there is no data where the HT-SIG symbols are supposed to be.</p> <p>CRCFail: The HT-SIG symbols were found and decoded, but the</p> | | |

| | | | |
|-------|--|------|------|
| | <p>resulting checksum (CRC) fails.</p> <p>CRCPassed: The HT-SIG symbols were found and decoded, and the resulting checksum (CRC) passed, and no other obvious problems were found.</p> | | |
| L-Sig | <p>The measurement demodulates and decodes the L-SIG symbol found before the start of the data in Non-HT Duplicate and HT-mixed Mode signals, and this output variable gives the status of the L-SIG demodulation. Possible values are:</p> <p>None: There is no L-SIG symbol. This would happen if the input signal is an HT-greenfield format signal.</p> <p>Unknown: Nothing is known about the L-SIG symbols. This would happen if the input vector is so small that there is no data where the L-SIG symbol is supposed to be.</p> <p>ParityWrong: The L-SIG symbol was found and decoded, but the resulting parity bit is incorrect.</p> <p>ParityOk: The L-SIG symbol was found and decoded, and the resulting parity bit is correct, and no other obvious problems were found.</p> | None | None |

HT-Sig Content

| | | | |
|----------|--|------|------|
| MCS | <p>The Modulation and Coding Scheme (MCS) is a value that determines the modulation, coding and number of spatial channels. It is a compact representation that is carried in the HT SIGNAL field. Rate dependent parameters for the full set of modulation and coding schemes (MCS)</p> | None | None |
| CBW | 20 MHz, 40 MHz, Unknown (Invalid data.) | None | None |
| HTLen | The number of octets of data in the PSDU in the range 0-65535. | None | None |
| Smooth | <p>Y indicates that channel estimate smoothing is recommended.</p> <p>N indicates that only per-carrier independent (unsmoothed) channel estimate is recommended.</p> <p>Unknown indicates invalid data.</p> | None | None |
| NotSnd | <p>Y indicates that the PPDU is not a sounding PPDU.</p> <p>N indicates that the PPDU is a sounding PPDU</p> <p>Unknown indicates invalid data.</p> | None | None |
| Reserved | <p>1: Reserved.</p> <p>0: Non reserved.</p> <p>-999: Invalid fatd.</p> | None | None |
| STBC | <p>Set to a non-zero number, to indicate the difference between the number of space time streams () and the number of spatial streams () indicated by the MCS.</p> <p>-999 indicate invalid data.</p> | None | None |
| RECCode | LDPC:1 | None | None |

| | | | |
|------------|---|------|------|
| | BCC: 0 Unknown indicates invalid data. | | |
| ShortGI | Y N Unknown indicates invalid data. | None | None |
| ExtStreams | Indicates the Number of extension spatial streams (). | None | None |
| CRC | Its format is HEX. | None | None |
| Tail | Used to terminate the trellis of the convolution coder. Its format is HEX. | None | None |

L-Sig Content

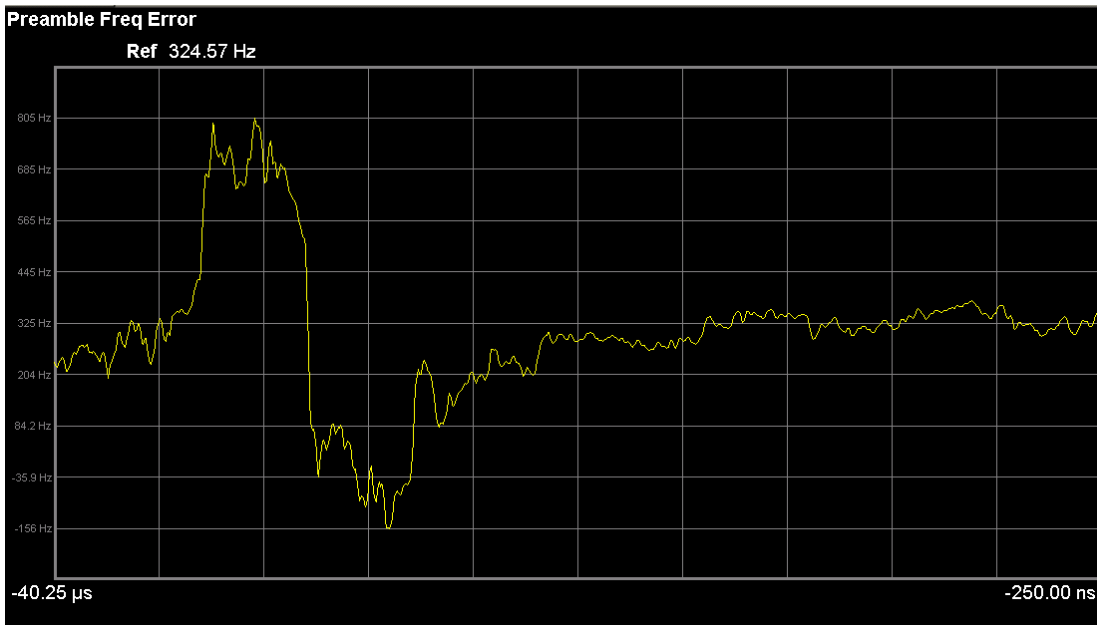
| Rate | Data Rate. | MBits/s | ## MBits/s |
|----------|---|---------|------------|
| Reserved | 1 or 0. | None | None |
| Len | It indicates the number of octets in the PSDU. | None | None |
| Parity | Its format is Hex. | | |
| Tail | Used to terminate the trellis of the convolution coder. The PLCP tail bit field shall be produced by replacing six scrambled "zero" bits following the message end with six no scrambled "zero" bits. Its format is Hex. | | |

Preamble Freq Error vs. Time

Frequency error is the difference between the measured center frequency of the transmitted signal and the setting center frequency. This trace shows how the measured center frequency drifts during the preamble part of the burst. The units of this trace are in Hz. This includes the constant frequency error in addition to any time-varying frequency error.

Preamble Frequency Error is sampled at 64 times the subcarrier spacing for 802.11 a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz), and 128 times the subcarrier spacing for 802.11n (40 MHz).

The view will be looked like below:



For 802.11a/g (OFDM) signal, the trace length is coupled with Sync Training Sequence. When Sync Training Sequence is set to Short, Preamble Frequency Error covers both the short training sequence and the long training sequence(channel estimation sequence), the length will be 16us. When the Sync type parameter is set to Long (Channel Estimation Sequence), Preamble Frequency Error covers only the channel estimation sequence, the length will be 8us.

For 802.11g (DSSS-OFDM), it can only use Long Sync Training Sequence, since it does not contain the short training sequence

For 802.11n signal, the trace length is auto determined by signals.

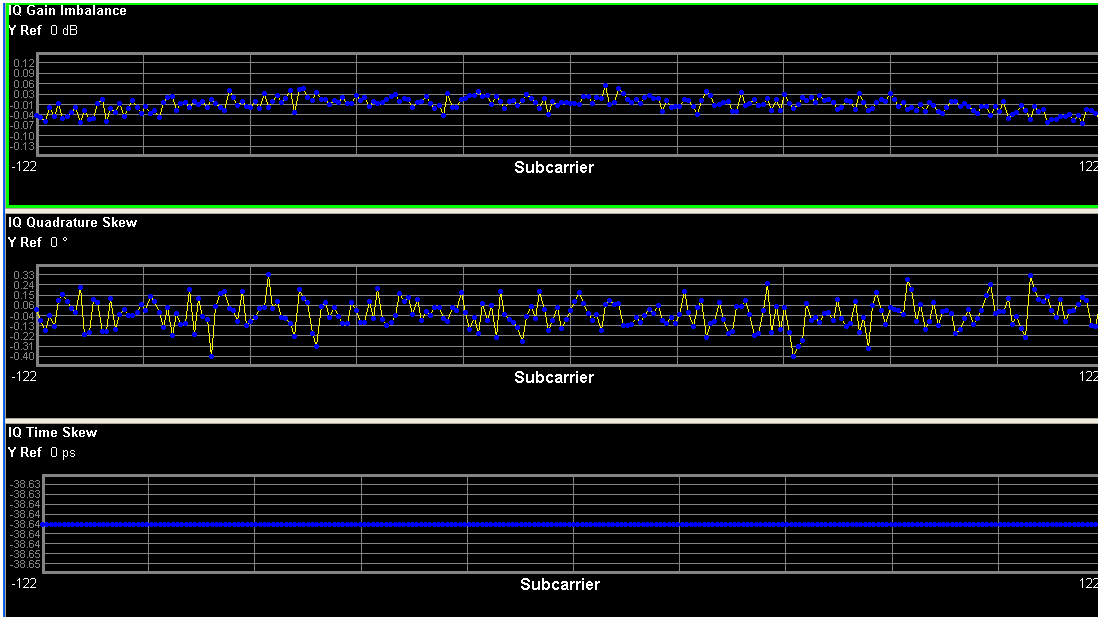
For HT-mixed signals, the Preamble Frequency Error covers only the Legacy Short Training Field (L-STF) and Legacy Long Training Field (L-LTF) parts of the preamble. This is the initial 16 us of the burst.

For HT-greenfield signals, the Preamble Frequency Error covers only the Legacy Short Training Field (L-STF) and the First High Throughput Long Training Field (HT-LTF1) parts of the preamble. This is the initial 16 us of the burst.

| Key Path | View/Display |
|----------------------|--------------|
| Initial S/W Revision | A.10.01 |

I/Q Impairments

The I/Q Impairments (Triple View) view consists of 3 windows.



IQ Gain Imbalance vs. Carrier

Provides IQ Gain Imbalance vs. Carrier results.

| | |
|---------------------|--|
| Marker Operation | Yes (Subcarrier - IQ Gain Imbalance) |
| Corresponding Trace | n=19 IQ gain imbalance vs. Carrier trace |

IQ Quadrature Skew vs. Carrier Window

Provides IQ Quadrature Skew vs. Carrier results.

| | |
|---------------------|--|
| Marker Operation | Yes (Subcarrier - IQ Quadrature Skew) |
| Corresponding Trace | n=20 IQ quadrature error vs. Carrier trace |

EVM vs. Carrier

Provides Magnitude EVM vs. Carrier results.

| | |
|---------------------|----------------------------------|
| Marker Operation | Yes (Subcarrier - Magnitude EVM) |
| Corresponding Trace | n=3 EVM vs. Carrier Trace |

| | |
|----------|--------------|
| Key Path | View/Display |
|----------|--------------|

Segment Number

This is a new section. It should be added as section 2.26.3 Segment Number.

Select Segment 1 or Segment 2 for 802.11ac 80+80MHz signals.

Segment Number is used to specify which channel results should be displayed in views or queried by SCPI. If Segm1 is selected, the contents both in views and queried by SCPI are the results of the first Segment ; If Segm2 is selected, the contents both in views and queried by SCPI are the results of the second Segment.

| Key Path | View/Display |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SEGMent SEGM1 SEGM2 :CALCulate:EVM:SEGMent? |
| Example | :CALC:EVM:SEGM SEGM2 :CALC:EVM:SEGM? |
| Couplings | If option N9077A-4fP is not available, this key will be blanked. If option N9077A-4fP is installed, but standard is not 802.11ac 80+80MHz, this key will be gray out. |
| Preset | SEGM1 |
| State Saved | Saved in instrument state. |
| Range | Segment1 Segment2 |

(Undefined variable: Primary.ProductName)
WLAN Mode Reference

14 WLAN MIMO Modulation AnalysisMeasurement

This section includes the following topics:

"Measurement Commands for MIMO Modulation Analysis" on page
2132

"Remote Command Results for MIMO Modulation Analysis
Measurement " on page 2133

Measurement Commands for MIMO Modulation Analysis

The following commands are used to retrieve the measurement results:

- :CONFigure:EVMMimo
- :CONFigure:EVMMimo:NDEFault
- :INITiate:EVMMimo
- :FETCh:EVMMimo[n]?
- :READ:EVMMimo[n]?
- :MEASure:EVMMimo[n]?

Remote Command Results for MIMO Modulation Analysis Measurement

| Index: n <Mnemonic> | Results Returned |
|------------------------|---|
| 0 | <p>Returns unprocessed I/Q trace data of Capture Interval, as a series of trace point values for Channel m. Channel index m can be set and queried through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details.</p> <p>The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.</p> |
| 1 (or not specified) | <p>Returns the comma-separated EVM results by stream. The EVM scalar results for each stream are in the following order:</p> <ol style="list-style-type: none"> 1. RMS EVM Max (dB) 2. RMS EVM Avg (dB) 3. Peak EVM Max (dB) 4. Peak EVM Avg (dB) 5. Pilot EVM Max (dB) 6. Pilot EVM Avg (dB) 7. Data EVM Max (dB) 8. Data EVM Avg (dB) 9. CPE EVM Max (dB) 10. CPE EVM Avg (dB) <p>When MIMO Type is 2X2, this result gives stream 1 EVM scalar results first, then stream 2 EVM scalar results. When MIMO Type is 3X3, stream 1, 2 and 3 EVM scalar results are provided in order. When MIMO Type is 4X4, returns 40 comma-separated EVM scalar results are provided in stream order.</p> |
| 2 | <p>Returns a value of the pass/fail (0.0 = passed, or 1.0 = failed) results determined by testing the result of RMS EVM. Only when all the stream RMS EVM Average results are passed, will this value be passed.</p> |
| 3 | <p>Returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace for STRM m. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result Stream Index for details.</p> <p>The magnitude of each I and Q pair are normalized to 1.0, when the IQ Normalize is turned on. The first number is the in-phase (I) sample and the second is the quadrature-phase (Q) sample.</p> |
| 4 | <p>Returns series of floating point numbers (in dB) that represent each sample in the Stream EVM vs. Carrier trace of Capture Interval for STRM m. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result Stream Index for details.</p> |
| 5 | <p>Returns series of floating point numbers (in dB) that represent each sample in the Stream EVM vs. Symbol trace of Capture Interval for STRM m. The first number is the symbol 0 decision point. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result Stream Index for details.</p> |
| 6 | <p>Returns series of floating point numbers that represent each sample in the Channel Response for STRM m CH k. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result Stream Index for details. Channel index k can be set and queried through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details.</p> |
| 7 | <p>Returns comma-separated EVM scalar results by channel. The EVM scalar results for each channel are in the following order:</p> |

-
1. RMS EVM Max (dB)
 2. RMS EVM Avg (dB)
 3. Peak EVM Max (dB)
 4. Peak EVM Avg (dB)
 5. Pilot EVM Max (dB)
 6. Pilot EVM Avg (dB)
 7. Data EVM Max (dB)
 8. Data EVM Avg (dB)
 9. Freq Error Max (Hz)
 10. Freq Error Avg (Hz)
 11. Freq Error Ppm Max (ppm)
 12. Freq Error Ppm Avg (ppm)
 13. Sym Clock Error Max (ppm)
 14. Sym Click Error Avg (ppm)
 15. IQ Gain Imb Max (dB)
 16. IQ Gain Imb Avg (dB)
 17. IQ Offset Max (dB)
 18. IQ Offset Avg (dB)
 19. IQ Quad Error Max (degree)
 20. IQ Quad Error Avg (degree)
 21. IQ Timing Skew Max (s)
 22. IQ Timing Skew Avg (s)
 23. Cross Pwr Max (dB)
 24. Cross Pwr Avg (db)
 25. Sync Corr Max
 26. Sync Corr Avg
 27. Avg Burst Power Max (dBm)
 28. Avg Burst Power Avg (dBm)
 29. Peak Burst Power Max (dBm)
 30. Peak Burst Power Avg (dBm)
- When MIMO Type is 2X2, 60 comma-separated scalar results are returned;
 When MIMO Type is 3X3, 90 comma-separated scalar results are returned;
 When MIMO Type is 4X4, 120 comma-separated scalar results are returned.
-

| | |
|----|--|
| 8 | Return the Channel Matrix results |
| 9 | Return the decode bits of HT-SIG Signal. |
| 10 | Returns series of floating point numbers (in dB) that represent each sample in the Equalizer Impulse Response for STRM m CH k. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result Stream Index for details. Channel index k can be set and queried through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details. |
| 11 | Returns comma-separated floating point numbers of spectral flatness trace for STRM m CH k. Stream index m can be set and queried through EVMM:RESult:STReam command. See 2.15.3 MIMO Result |

| | |
|----|---|
| | Stream Index for details. Channel index k can be set and queried through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details. |
| 12 | Returns Data Rate (in Mbps) for MIMO input signals |
| 13 | Returns the FFT SEM trace consisting of 5001 points if SEM is activated for Ch k. Chan index k can be set and queried through through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details. |
| 14 | Returns the SEM failed information consisting of (2(DeltaFreq,DeltaAmplitude) x 6(OffsetA Lower, OffsetA Upper, OffsetB Lower, OffsetB Upper, Offset C Lower, Offset C Upper)=12 values in upper and lower bands of three offsets for Ch k. Chan index k can be set and queried through through EVMM:RESult:CHAN command. See 2.15.4 MIMO Result Channel Index for details. |

Selects the MIMO Modulation Analysis measurement.

| Key Path | Meas |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.14.00 |

Range

The Range menu allows setting amplitude controls of the instrument.

| | |
|----------------------|----------------------|
| Key Path | AMPTD Y Scale |
| Scope | Meas Global |
| Initial S/W Revision | A.12.50 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|-----------------------------|---|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe <real></code> <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation OFF ON ELECTrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe :OPTimize :ATTenuation?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|----------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWer [:RF] :RANGe :PARatio?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |

| | |
|----------------------|---------------------------|
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|-----------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet <real> [:SENSe] :POWer [:RF] :RANGe :MIXer :OFFSet? |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 2139

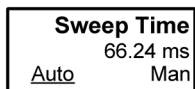
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPle ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

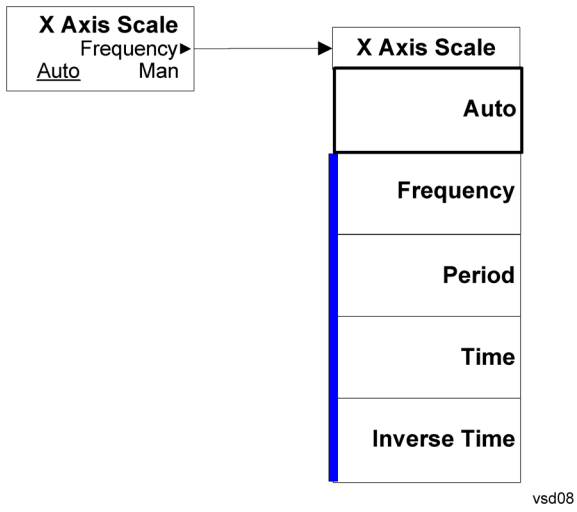
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



BW

Accesses a menu that allows you to control bandwidth settings.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.10.01 |

Info BW

Activates the **Info BW** active function, which allows you to manually set the information bandwidth (Info BW) of the analyzer.

| | |
|-------------------------------------|--|
| Key Path | BW |
| Mode | WLAN |
| Remote Command | [:SENSE] :EVM: BANDwidth [:RESolution] <bandwidth> [:SENSE] :EVM: BANDwidth [:RESolution] ? |
| Example | EVM: BAND 20e6 EVM: BAND ? |
| Couplings | Info BW is coupled with Subcarrier Spacing |
| Preset | Info BW is limited by hardware capability if Radio Std is 802.11a/b/g = 25MHz if Radio Std is 802.11n-20M = 25MHz if Radio Std is 802.11n-40M = 40MHz if Radio Std is 802.11ac-20M = 25MHz if Radio Std is 802.11ac-40M = 40MHz if Radio Std is 802.11ac-80M / 80M+ 80M = 80MHz if Radio Std is 802.11ac-160M = 160MHz if Radio Std is 802.11ah-1MHz : 3MHz if Radio Std is 802.11ah-2M = 3MHz if Radio Std is 802.11ah-4M = 4MHz if Radio Std is 802.11ah-8M = 8MHz if Radio Std is 802.11ah-16M = 16MHz (25MHz if only B25 option installed) if Radio Std is 802.11j/p-10M = 10MHz if Radio Std is 802.11p-5M = 5MHz |
| State Saved | Saved in instrument state. |
| Min | 1 kHz |
| Max | Hardware Dependent: B25 = 25 MHz WB (40 MHz or wider) = Hardware Option Limit |
| Backwards Compatibility SCPI | [:SENSE] :EVM: I FBW |

| | |
|----------------------|---------|
| Initial S/W Revision | A.10.01 |
|----------------------|---------|

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 272

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements - it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 2149](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 2151](#)

See ["Center Frequency Presets" on page 2147](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 2147 and "RF Center Freq" on page 2149 and Ext Mix Center Freq and "I/Q Center Freq" on page 2151. |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 2147 and "RF Center Freq" on page 2149 and "I/Q Center Freq" on page 2151. |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 2147 and "RF Center Freq" on page 2149 and "I/Q Center Freq" on page 2151. |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:RF:CENTer <freq></code> <code>[:SENSe] :FREQuency:RF:CENTer?</code> |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|---|
| Scope | Meas Global |
| Remote Command | <code>[:SENSe] :FREQuency:EMIXer:CENTer <freq></code> <code>[:SENSe] :FREQuency:EMIXer:CENTer?</code> |
| Example | <code>:FREQ:EMIX:CENt 60 GHz</code> <code>:FREQ:EMIX:CENt?</code> |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|-----------------------|---|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP [:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500 MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO? |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | Span, RBW, Center frequency If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | Auto ADEM0D: 1 MHz ON |
| State Saved | Saved in instrument state |
| Min | - (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Input/Output

See ["Input/Output" on page 162](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement. See Front Panel Key@3547@i for more information

| | |
|----------------------|-----------------|
| Key Path | Front-panel key |
| Initial S/W Revision | A.14.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|---------|
| Key Path | Marker |
| Initial S/W Revision | A.14.00 |

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, reference value of the selected marker appears on the Active Function area.

Active Function Display:

Marker index at I/Q Measured Polar Vector view

Marker X-axis value at other views

Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.

The marker X axis value entered in the active function area displays the marker value to its full entered precision.

| | |
|----------------|--|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVMMimo:MARKer[1] 2 ... 12:MODE POSition DELTA =OFF :CALCulate:EVMMimo:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:EVMM:MARK:MODE POS CALC:EVMM:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: The active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. |

Active Function Display:
 - the marker index for the IQ Measured Polar Vector graph
 - the marker X axis value for any other graph
 The value entered in the active function area displays the marker value to its full entered precision.

| | |
|----------------------|----------------------------|
| Preset | =OFF |
| State Saved | Saved in instrument state. |
| Range | Normal Delta =Off |
| Initial S/W Revision | A.14.00 |

Properties

Accesses a menu that enables you to select a reference marker and marker trace.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.14.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|---------------|
| Key Path | Marker |
| Initial S/W Revision | A.14.00 |

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

| | |
|----------------|--|
| Key Path | Marker, Properties |
| Mode | WLAN |
| Remote Command | :CALCulate:EVMMimo:MARKer[1] 2 ... 12:REference <integer> :CALCulate:EVMMimo:MARKer[1] 2 ... 12:REference? |
| Example | CALC:EVMM:MARK:REF 3 CALC:EVMM:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried, a single value is returned (the specified marker number's relative marker). |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |

| | |
|----------------------|---------|
| Min | 1 |
| Max | 12 |
| Initial S/W Revision | A.14.00 |

Marker Trace

Assigns the specified marker to the designated trace.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | <pre>:CALCulate:EVM:MARKer[1] 2 ... 12:TRACe POLar EVM MERRor PERRor EVMS EVMC PFERror IQGain IQQuad IQTime :CALCulate:EVM:MARKer[1] 2 ... 12:TRACe?</pre> |
| Example | <pre>CALC:EVM:MARK2:TRAC EVM CALC:EVM:MARK:TRACE?</pre> |
| Couplings | <p>EVM, MERRor, PERRor, PFERror will be available if the Radio Std is 802.11b/g (DSSS/CCK/PBCC), otherwise they are grayed out</p> <p>EVMS and EVMC will be available if the Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah otherwise they are grayed out</p> <p>IQGain, IQQuad, and IQTime will be available if the Radio Std is 802.11n, 802.11ac or 802.11ah, otherwise they are grayed out.</p> |
| Preset | POLar |
| State Saved | Saved in instrument state. |
| Range | EVM Mag Err Phase Err EVM vs Symbol EVM vs Carrier IQ Polar |
| Initial S/W Revision | A.10.01 |

Complex Spectrum Measurement

The complex spectrum measurement provides spectrum analysis capability for the instrument. The control of the measurement was designed to be familiar to those who are accustomed to using swept spectrum analyzers. For more details about this measurement, see the section "[Complex Spectrum Measurement Description](#)" on page 2158 below.

This topic contains the following sections:

["Measurement Commands for Complex Spectrum"](#) on page 2157

["Remote Command Results for Complex Spectrum"](#) on page 2157

Measurement Commands for Complex Spectrum

The general functionality of CONFIGure, INITiate, FETCh, MEASure, and READ are described in the section "[Remote Measurement Functions](#)" on page 2430. See the SENSE subsystem commands for more measurement related commands.

```
:CONFigure:SPECTrum
:CONFigure:SPECTrum:NDEFault
:INITiate:SPECTrum
:FETCh:SPECTrum[n]?
:MEASure:SPECTrum[n]?
:READ:SPECTrum[n]?
```

Remote Command Results for Complex Spectrum

The following table shows the returned results of the FETCh|MEASure|READ queries.

| n | Results Returned |
|----------------------|---|
| 0 | Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| not specified or n=1 | Returns the following comma-separated scalar results: <ol style="list-style-type: none"> 1. FFT peak is the FFT peak amplitude. 2. FFT frequency is the FFT frequency of the peak amplitude. 3. FFT points is the Number of points in the FFT spectrum. 4. First FFT frequency is the frequency of the first FFT point of the spectrum. 5. FFT spacing is the frequency spacing between the FFT points of the spectrum. 6. Time domain points is the number of points in the time domain trace used for the FFT. The number of points doubles if the data is complex instead of real. See the time domain scalar description below. 7. First time point is the time of the first time domain point, where time zero is the trigger event. 8. Time spacing is the time spacing between the time domain points. The time spacing value doubles if the data is complex instead of real. See the time domain scaler description below. 9. Time domain returns a 1 if time domain is complex (I/Q) and complex data will be returned. It returns a 0 if the data is real. (raw ADC samples) When this value is 1 rather than 0 (complex vs. real data), the time domain points and the time spacing scalars both increase by a factor of two. 10. Scan time is the total scan time of the time domain trace used for the FFT. The total scan time = (time spacing) x (time domain points – 1) 11. Current average count is the current number of data measurements that have already been combined, in the averaging calculation. |
| 2 | Returns the trace data of the log-magnitude versus time. (That is, the RF envelope.) |
| 3 | Returns the I and Q trace data. It is represented by I and Q pairs (in volts) versus time. |
| 4 | Returns spectrum trace data. That is, the trace of log-magnitude versus frequency. (The trace is computed using a FFT.) |
| 5 | Returns the averaged trace data of log-magnitude versus time. (That is, the RF envelope.) |
| 6 | Not used. |
| 7 | Returns the averaged spectrum trace data. That is, the trace of the averaged log-magnitude versus frequency. |

| n | Results Returned |
|----|--|
| 8 | Not used. |
| 9 | Returns a trace containing the shape of the FFT window. |
| 10 | Returns trace data of the phase of the FFT versus frequency. |
| 11 | Returns comma-separated linear spectrum trace data in Volts RMS. |
| 12 | Returns comma-separated averaged linear spectrum trace data in Volts RMS. |
| 13 | Returns the following comma-separated scalar results: <ol style="list-style-type: none"> 1. I/Q Magnitude and Phase Delta Results available (0 = not available, 1 = available). Results are available when the last measurement was made with I/Q Magnitude and Phase Delta Results enabled (SPEC:IQD:ENAB ON) and the setup was valid for generating the results (invalid setup when input is I/Q, I/Q Path is I+jQ, and Center Frequency is not 0 Hz) 2. Delta magnitude and phase trace (results 14 - 17) start frequency (0 when I/Q Magnitude and Phase Delta Results not available) 3. Delta magnitude and phase trace (results 14 - 17) number of points (1 when I/Q Magnitude and Phase Delta Results not available) 4. Delta magnitude and phase trace (results 14 - 17) frequency spacing between points (0 when I/Q Magnitude and Phase Delta Results not available) 5. Current average count (1 when I/Q Magnitude and Phase Delta Results not available) 6. Frequency of the FFT trace (result 4) peak magnitude in Hz (0 when I/Q Magnitude and Phase Delta Results not available) 7. Delta magnitude at the FFT trace peak magnitude frequency in dB (-999 when I/Q Magnitude and Phase Delta Results not available) 8. Delta phase at the FFT trace peak magnitude frequency in radians (-999 when I/Q Magnitude and Phase Delta Results not available) 9. Delta phase at the FFT trace peak magnitude frequency in degrees (-999 when I/Q Magnitude and Phase Delta Results not available or invalid setup) 10. Frequency of the averaged FFT trace (result 7) peak magnitude in Hz (0 when I/Q Magnitude and Phase Delta Results not available) 11. Averaged delta magnitude at the averaged FFT trace peak magnitude frequency in dB (-999 when I/Q Magnitude and Phase Delta Results not available) 12. Averaged delta phase at the averaged FFT trace peak magnitude frequency in radians (-999 when I/Q Magnitude and Phase Delta Results not available) 13. Averaged delta phase at the averaged FFT trace peak magnitude frequency in degrees (-999 when I/Q Magnitude and Phase Delta Results not available) |
| 14 | Current delta magnitude trace in dB (-999 when I/Q Magnitude and Phase Delta Results not available) |
| 15 | Current delta phase trace in radians (-999 when I/Q Magnitude and Phase Delta Results not available) |
| 16 | Averaged delta magnitude trace in dB (-999 when I/Q Magnitude and Phase Delta Results not available) |
| 17 | Averaged delta phase trace in radians (-999 when I/Q Magnitude and Phase Delta Results not available) |

Complex Spectrum Measurement Description

This measurement is FFT (Fast Fourier Transform) based. The FFT-specific parameters are located in the advanced menu. Also available under basic mode spectrum measurements is an I/Q window, which shows

the I and Q signal waveforms in parameters of voltage versus time. The advantage of having an I/Q view available while in the spectrum measurement is that it allows you to view complex components of the same signal without changing settings or measurements.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an “equal X Axis movement” of every other marker which is active. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going offscreen.

| | |
|-----------------------|--|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVMMimo:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EVMMimo:MARKer:COUPle[:STATe]? |
| Example | CALC:EVMM:MARK:COUP ON CALC:EVMM:MARK:COUP? |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.14.00 |

All Markers Off

Turns off all markers.

| | |
|-----------------------|--------------------------------|
| Key Path | Marker |
| Mode | WLAN |
| Remote Command | :CALCulate:EVMMimo:MARKer:AOff |
| Example | CALC:EVMM:MARK:AOff |
| Initial S/W Revision | A.14.00 |

Marker Function

There are no 'Marker Functions' supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Marker To

There is no 'Marker To' functionality supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 2431](#)

["Current Measurement Query \(Remote Command Only\)" on page 2433](#)

["Limit Test Current Results \(Remote Command Only\)" on page 2433](#)

["Data Query \(Remote Command Only\)" on page 2433](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 2434](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 2439](#)

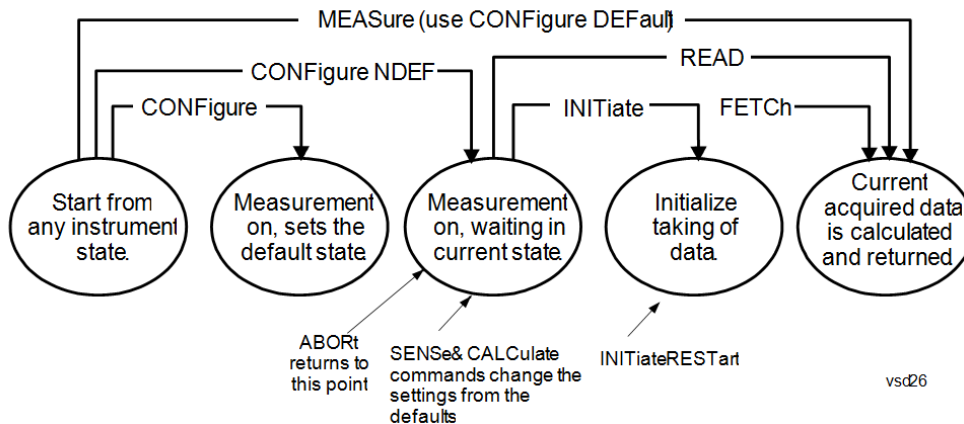
["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 2440](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 2454](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 2455](#)

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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
-

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
-

measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
-

| | |
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| Initial S/W Revision | Prior to A.02.00 |
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Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

| | |
|-----------------------|-------------|
| Remote Command | :CONFigure? |
|-----------------------|-------------|

| | |
|----------------|-------|
| Example | CONF? |
|----------------|-------|

| | |
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| Initial S/W Revision | Prior to A.02.00 |
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Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

| | |
|-----------------------|--------------------------|
| Remote Command | :CALCulate:CLIMits:FAIL? |
|-----------------------|--------------------------|

| | |
|----------------|--|
| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
|----------------|--|

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| Initial S/W Revision | Prior to A.02.00 |
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Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
| Initial S/W Revision | Prior to A.02.00 |

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

| | |
|-----------------------------|---|
| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
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- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

-

NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

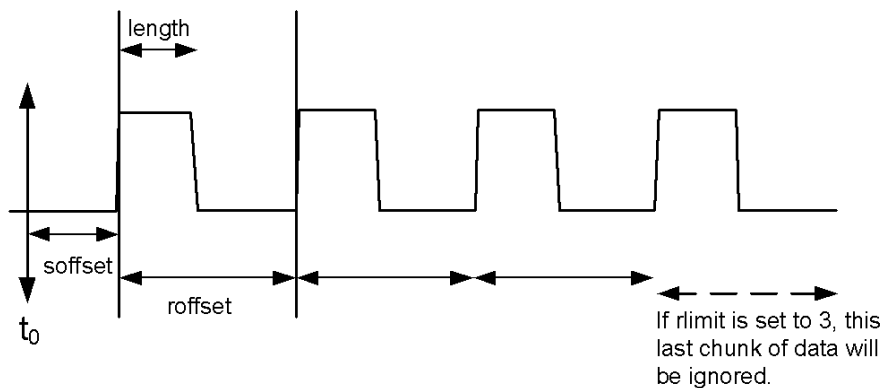
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

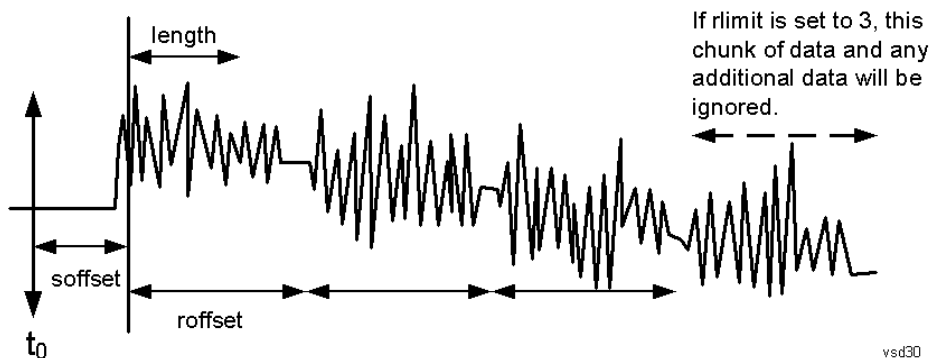
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

| | |
|-----------------------|---|
| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLLine LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
|-----------------------|---|

| | |
|----------------|---|
| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
|----------------|---|

| | |
|--------------|---|
| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
|--------------|---|

excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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| Initial S/W Revision | Prior to A.02.00 |
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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet |
| Example | :CALC:FPOW:POW1:RES |

| | |
|----------------------|-------------------------|
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|----------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

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| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

| | |
|---|--|
| M | All |
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| R | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine? |
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| C | |
| o | |
| m | |
| m | |
| a | |
| n | |
| d | |
| E | :CALC:FPOW:POW1:DEF? |

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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
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| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

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| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMal SWAPped :FORMat:BORDER? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Accesses the measurement setup menu for the current measurement.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

Avg/Burst Number

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action.

Avg number is the number of bursts, is NOT the number of data acquisition. If search length is large enough to include all the bursts, acquisition will only execute once (single mode). If the bursts number include in one capture is smaller than average number, multi capture and measurement is necessary.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

| Key Path | Meas Setup |
|----------------------|---|
| Mode | WLAN |
| Remote Command | [:SENSe]:EVM:AVERage:COUNT <integer> [:SENSe]:EVM:AVERage:COUNT? [:SENSe]:EVM:AVERage[:STATe] OFF ON 0 1 [:SENSe]:EVM:AVERage[:STATe]? |
| Example | EVM:AVER:COUN 1 EVM:AVER:COUN? EVM:AVER OFF EVM:AVER? |
| Preset | 10 ON |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 10000 |
| Initial S/W Revision | A.10.01 |

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

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|------------------|--|
| KEY:Exponential | After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average. |
| SCPI:EXPonential | |

| | |
|-------------|--|
| KEY:Repeat | After reaching the average count, the averaging is reset and a new average is started. |
| SCPI:REPeat | The default value is Exp. |

| | |
|-----------------------|--|
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:AVERAge:TCONtrol EXPonential REPeat [:SENSe] :EVM:AVERAge:TCONtrol? |
| Example | EVM:AVER:TCON REP EVM:AVER:TCON? |
| Preset | EXP |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | A.10.01 |

Meas Time

Accesses the meas time menu for the current measurement.

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

Search Length

Sets the length of time to acquire the input signal. This defines the length of time that the burst search is performed.

The analyzer searches within the specified search length, find all burst positions within this search length, and demodulates burst one by one if average state is on and average number is still not reached. If one acquisition does not include total required bursts, multi capture is needed. So if want to get results for continues bursts, make sure search length is large enough to include all the bursts. Otherwise multi acquisitions will be performed.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:SLENgth <time> [:SENSe] :EVM:TIME:SLENgth? [:SENSe] :EVM:TIME:SEARchlength <real> [:SENSe] :EVM:TIME:SEARchlength? |
| Example | EVM:TIME:SLEN 1ms |

| | |
|-------------------------------------|--|
| | EVM:TIME:SLen? |
| Notes | Min Value is coupled with Radio Std, Result Length, Guard Interval and Subcarrier Spacing Max Value is coupled with Radio Std, Info BW |
| Preset | 1.0 ms |
| State Saved | Saved in instrument state. |
| Min | <p>If Radio Std is 802.11a/g/j/p (OFDM) or 801.11g (DSSS-OFDM) If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 9) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 9) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$</p> <p>If Radio Std is 802.11n (20 MHz)/(40 MHz): If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$</p> <p>If Radio Std is 802.11ac or 802.11ah If Result Length is set to Man, Min Value will be: $1.17 * (\text{Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$ If Result Length is set to Auto, Min Value will be: $1.17 * (\text{Max Result Length} + 13) * (1 + \text{Guard Interval}) / \text{Subcarrier Spacing}$</p> <p>If Radio Std is 802.11b/g (DSSS/CCK/PBCC): If Result Length is set to Man, Min Value will be: Ceil (Result Length/Chip Rate) usec If Result Length is set to Auto, Min Value will be: Ceil (Max Result Length/Chip Rate) usec</p> |
| Max | <p>Hardware Dependent: 4000000 / Sampling Rate B25: Sampling Rate = 45M (when info BW is 25MHz); WB (B40 or Wider): Sampling Rate = Info BW * 1.25</p> |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TIME:SEARChlength |
| Initial S/W Revision | A.10.01 |

Meas Interval

For standard 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, or 802.11ah:

This parameter specifies the measurement interval (length), in symbol times, of the portion of the OFDM burst that will be analyzed. This analyzed portion of the OFDM burst starts at a measurement offset specified by Meas Offset.

| Key Path | Meas Setup, Meas Time |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :EVM:TIME:INTerval <integer></code> <code>[:SENSe] :EVM:TIME:INTerval?</code> |
| Example | EVM:TIME:INT 15 EVM:TIME:INT? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2794 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 1 symbols 802.11b/g (DSSS/CCK/PBCC): 1 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM): 1367 symbols 802.11n , 802.11ac, and 802.11ah: 21848 symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability. |
| Initial S/W Revision | A.10.01 |

Meas Offset

802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah:

This parameter specifies the measurement offset, in symbol times, of the portion of the OFDM burst that will be analyzed. The length of this analyzed portion of the OFDM burst is specified by Meas Interval.

802.11b/g (DSSS/CCK/PBCC):

Used to set the measurement offset, in chips, of the portion of the WLAN burst that will be analyzed. The length of this analyzed portion of the WLAN burst is specified by Meas Interval. If the specified measurement offset is less than zero, a value of zero is used instead.

The measurement interval and offset are relative to the ideal starting point of the PLCP preamble portion of the burst. For a signal that uses the long PLCP format, the ideal starting point of the PLCP preamble is exactly 128 symbol times (128*11 chip times) before the start of the SFD sync pattern. For a signal that uses the short PLCP format, the ideal starting point of the PLCP preamble is exactly 56 symbol times (56*11 chip times) before the start of the SFD sync pattern.

| Key Path | Meas Setup, Meas Time |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | <code>[:SENSe] :EVM:TIME:OFFSet <integer></code> <code>[:SENSe] :EVM:TIME:OFFSet?</code> |

| | |
|-----------------------------|---|
| Example | EVM:TIME:OFFS 15 EVM:TIME:OFFS? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std and Result Length |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 0 symbols 802.11b/g (DSSS/CCK/PBCC): 22 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 0 symbols 802.11b/g (DSSS/CCK/PBCC): 0 chips |
| Max | If Result Length is Auto, then the specified measurement offset will be clipped to be less than or equal to the value of Max Result Length – Meas Interval. If Result Length is Man, then the specified measurement offset will be clipped to be less than or equal to the value of Result Length – Meas Interval. |
| Initial S/W Revision | A.10.01 |

Result Length

For 802.11a/g/j/p (OFDM) and 801.11g (DSSS-OFDM), when Result Length is Auto, the length of the burst is auto-detected. The result length is determined from the decoded SIGNAL symbol. The value of Max Result Length specifies the maximum result length for the burst; any burst longer than that will be treated as though that were the length of the burst.

When Result Length is Man, you can specify the result length of the burst regardless of the actual length of the burst.

- For 802.11n, if From HT-Sig is On:

The result length is detected from the High Throughput Signal Field. It compares the decode length information to the Max Result Length parameter and uses the smaller value as the measurement result length.

- For 802.11n, if From HT-Sig is Off:

When Result Length is Auto, the analyzer automatically determines the measurement result length by burst search. It compares the detected result length to the Max Result Length parameter and uses the smaller value as the measurement result length.

When Result Length is Man, it compares the input result length to the Result Length parameter and uses the smaller value as the measurement.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:LENGth <integer> [:SENSe] :EVM:TIME:RESult:LENGth? [:SENSe] :EVM:TIME:RESult [:STATe] :AUTO OFF ON 0 1 [:SENSe] :EVM:TIME:RESult [:STATe] :AUTO? |

| | |
|----------------------|--|
| Example | EVM:TIME:RES:LENG 10 EVM:TIME:RES:LENG? EVM:TIME:RES:AUTO ON EVM:TIME:RES:AUTO? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2816 chips ON |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 2 symbols 802.11b/g (DSSS/CCK/PBCC): 150 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM): 1367 symbols 802.11n , 802.11ac, and 802.11ah: 21848 symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability |
| Initial S/W Revision | A.10.01 |

Max Result Length

Max Result Length specifies a maximum result length.

If the auto-detected length is greater than the specified maximum result length, the maximum result length is used instead.

The actual results returned will be for a subset of this maximum, as specified by the Meas Interval and Meas Offset, and will be further limited to the auto-detected result length if that is shorter than the maximum result length.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:MAX <integer> [:SENSe] :EVM:TIME:RESult:MAX? |
| Example | EVM:TIME:RES:MAX 45 EVM:TIME:RES:MAX? |
| Couplings | Default value, Min/Max value, will be coupled with Radio Std |
| Preset | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 60 symbols 802.11b/g (DSSS/CCK/PBCC): 2816 chips |
| State Saved | Saved in instrument state. |
| Min | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 2 symbols 802.11b/g (DSSS/CCK/PBCC): 150 chips |
| Max | 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n , 802.11ac, and 802.11ah: 21848 |

| | |
|-------------------------------------|---|
| | symbols 802.11b/g (DSSS/CCK/PBCC): 96360 chips Max value is also limited by Hardware capability |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TIME:RESMax <integer> [:SENSe] :EVM:TIME:RESMax? |
| Initial S/W Revision | A.10.01 |

From SIG Symbols

- For 802.11n, if From SIG Syms is On:

The result length is detected from the High Throughput Signal Field. It compares the decoded length information to the Max Result Length parameter and uses the smaller value as the measurement result length.

- For 802.11n, if From SIG Syms Off:

When Result Length is Auto, the analyzer automatically determines the measurement result length by burst search. It compares the detected result length to Max Result Length parameter and uses the smaller value as the measurement result length.

When Result Length is Man, it compares the input result length to the Result Length parameter and uses the smaller value as the measurement.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Meas Time |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:TIME:RESult:SIG OFF ON 0 1 [:SENSe] :EVM:TIME:RESult:SIG? |
| Example | EVM:TIME:RES:SIG ON EVM:TIME:RES:SIG? |
| Notes | If Radio Std is not 802.11n, 802.11ac or 802.11ah, it will be grayed out. The result length is determined by decoding the HT-SIG symbols and using the HT Length field. The value of Max Result Length specifies a maximum result length for the pulse; any pulse longer than that will be treated as though that were the length of the pulse. |
| Dependencies | The key is NOT available when Radio Std is 802.11b/g (DSSS/CCK/PBCC). |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Subcarrier

This parameter specifies whether the demodulation results are for all subcarriers in the signal, or for a single subcarrier, or for just the pilot subcarriers.

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SUBCarrier ALL PILOt SINGle :CALCulate:EVM:SUBCarrier? |
| Example | CALC:EVM:SUBC ALL CALC:EVM:SUBC? |
| Notes | Only effective in OFDM demodulation, if Radio Std is 802.11b/g (DSSS/CCK/PBCC), this key will be NOT available. |
| Preset | ALL |
| State Saved | Saved in instrument state. |
| Range | All Pilot Single |
| Readback Text | All Pilot subcarrier number (in integer format, like "Subcarrier 2") |
| Initial S/W Revision | A.10.01 |

Subcarrier Number

This parameter specifies the demodulation results are for which subcarrier. When Subcarrier selects "Single", this number will indicate which subcarrier is used to do demodulation.

| Key Path | Meas Setup |
|-----------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SUBCarrier:COUNT <integer> :CALCulate:EVM:SUBCarrier:COUNT |
| Example | CALC:EVM:SUBC:COUN 2 CALC:EVM:SUBC:COUN? |
| Notes | Only be available as in OFDM demodulation and Subcarrier is selected as Single, otherwise this key will be grayed out. For Radio Std 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz), 802.11ac (20 MHz), 802.11ah(1MHz), and 802.11ah (2 MHz) if the value was set to 0, it will change to 1. For Radio Std 802.11n (40MHz), 802.11ac (40MHz), 802.11ac (80MHz) or 802.11ac (80 + 80MHz), 802.11ah (4MHz), 802.11ah(8MHz), if the value was set to 0, it will be change to 2. For Radio Std 802.11ac (160MHz), and 802.11ah (16MHz), if the value was set to 0, it will be change to 6. |
| Dependencies | Only effective in OFDM demodulation, if Radio Std is 802.11b/g (DSSS/CCK/PBCC), this key will be NOT available. |
| Couplings | Valid only when Subcarrier selects "Single". Min and Max Value is coupled with Radio Std. |
| Preset | Radio Std 802.11ac (160MHz): 6 |

| | |
|----------------------|--|
| | Others : 2 |
| State Saved | Saved in instrument state. |
| Min | -26: if Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) -28: if Radio Std is 802.11n 20 MHz, 802.11ac 20 MHz. -58: if Radio Std is 802.11n 40 MHz, 802.11ac 40 MHz -122: if Radio std is 802.11ac 80MHz, 802.11ac 80+80MHz -250: if Radio std is 802.11ac 160MHz -13: if Radio Std is 802.11ah 1MHz -29: if Radio Std is 802.11ah 2MHz -61: if Radio Std is 802.11ah 4MHz -125: if Radio Std is 802.11ah 8MHz -253: if Radio Std is 802.11ah 16MHz |
| Max | 26: if Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) 28: if Radio Std is 802.11n 20 MHz, 802.11ac 20 MHz 58: if Radio Std is 802.11n 40 MHz, 802.11ac 40 MHz 122: if Radio std is 802.11ac 80MHz, 802.11ac 80+80MHz 250: if Radio std is 802.11ac 160MHz 13: if Radio Std is 802.11ah 1MHz 29: if Radio Std is 802.11ah 2MHz 61: if Radio Std is 802.11ah 4MHz 125: if Radio Std is 802.11ah 8MHz 253: if Radio Std is 802.11ah 16MHz |
| Initial S/W Revision | A.10.01 |

Subcarrier I/Q Estimation

This parameter allows turn On or Off the estimation for IQ Gain Imbalance vs. subcarrier, IQ Quadrature Error vs. subcarrier in the input signal.

| | |
|----------------|---|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:IQEstimation OFF ON 0 1 :CALCulate:EVM:IQEstimation? |
| Example | CALC:EVM: IQES ON CALC:EVM: IQES? |
| Notes | The accuracy of the IQ gain imbalance and quadrature error estimation is affected by the receiver's ability to determine the correct ideal reference constellation points for each symbol in the modulated signal. Large IQ impairments may result in incorrect determination of reference points, which will lead to incorrect estimates for the IQ errors. Generally, the receiver can provide correct IQ estimation with greater levels of IQ impairment for lower-order modulation such as QPSK than for higher-order modulation such as 64QAM. |

| | |
|----------------------|----------------------------|
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.14.01 |

Limits

Accesses the Limits menu allows you to set the fail/pass criteria of the limit check

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

BPSK-1/2 RMS EVM

Sets BPSK coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:BPSK:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:BPSK:R1B2 |
| Example | CALC:EVM:LIM:RMS:BPSK:R1B2 -20 CALC:EVM:LIM:RMS:BPSK:R1B2? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -5.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

QPSK-1/2 RMS EVM

Sets QPSK coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QPSK:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QPSK:R1B2 |

| | |
|----------------------|---|
| Example | CALC:EVM:LIM:RMS:QPSK:R1B2 -20 CALC:EVM:LIM:RMS:QPSK:R1B2? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -10.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

QPSK-3/4 RMS EVM

Sets QPSK coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QPSK:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QPSK:R3B4 |
| Example | CALC:EVM:LIM:RMS:QPSK:R3B4 -20 CALC:EVM:LIM:RMS:QPSK:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -13.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

16QAM-1/2 RMS EVM

Sets 16QAM coding rate 1/2 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA16:R1B2 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA16:R1B2 |
| Example | CALC:EVM:LIM:RMS:QA16:R1B2 -20 CALC:EVM:LIM:RMS:QA16:R1B2? |

| | |
|----------------------|---|
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -16.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

16QAM-3/4 RMS EVM

Sets 16QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA16:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA16:R3B4? |
| Example | CALC:EVM:LIM:RMS:QA16:R3B4 -20 CALC:EVM:LIM:RMS:QA16:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -19.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-2/3 RMS EVM

Sets 64QAM coding rate 2/3 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R2B3 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R2B3? |
| Example | CALC:EVM:LIM:RMS:QA64:R2B3 -20 CALC:EVM:LIM:RMS:QA64:R2B3? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -22.00 dB |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-3/4 RMS EVM

Sets 64QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R3B4 |
| Example | CALC:EVM:LIM:RMS:QA64:R3B4 -20 CALC:EVM:LIM:RMS:QA64:R3B4? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -25.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.10.01 |

64QAM-5/6 RMS EVM

Sets 64QAM coding rate 5/6 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit.

| | |
|----------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA64:R5B6 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA64:R5B6 |
| Example | CALC:EVM:LIM:RMS:QA64:R5B6 -20 CALC:EVM:LIM:RMS:QA64:R5B6? |
| Notes | This limit value is used in 802.11j/p 10M, 802.11p 5M, 802.11n, 802.11ac and 802.11ah |
| Preset | -27.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |

| | |
|----------------------|---------|
| Max | 0 |
| Initial S/W Revision | A.10.01 |

256QAM–3/4 RMS EVM

Sets 256QAM coding rate 3/4 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit. When the average RMS EVM result exceeds the limit, a red FAIL indicator appears in the PASS/FAIL indication. When the average RMS EVM result is less than the limit, a green PASS indicator appears in the PASS/FAIL indication.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA256:R3B4 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA256:R3B4 |
| Example | CALC:EVM:LIM:RMS:QA256:R3B4 -20 CALC:EVM:LIM:RMS:QA256:R3B4? |
| Notes | This limit value is used in 802.11ac or 802.11ah |
| Preset | -30.00 dB |
| State Saved | Saved in instrument state. |
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.11.01 |

256QAM–5/6 RMS EVM

Sets 256QAM coding rate 5/6 RMS EVM limit to warn you if the measured average RMS EVM value exceeds a limit. When the average RMS EVM result exceeds the limit, a red FAIL indicator appears in the PASS/FAIL indication. When the average RMS EVM result is less than the limit, a green PASS indicator appears in the PASS/FAIL indication.

| Key Path | Meas Setup, Limits |
|-----------------------|---|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:RMS:QA256:R5B6 <rel_ampl> :CALCulate:EVM:LIMit:RMS:QA256:R5B6 |
| Example | CALC:EVM:LIM:RMS:QA256:R5B6 -20 CALC:EVM:LIM:RMS:QA256:R5B6? |
| Notes | This limit value is used in 802.11ac or 802.11ah |
| Preset | -32.00 dB |
| State Saved | Saved in instrument state. |

| | |
|----------------------|----------|
| Min | -1000.00 |
| Max | 0 |
| Initial S/W Revision | A.11.01 |

Freq Error

Sets a frequency error limit to warn you if the measured maximum frequency error value exceeds the limit.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:FERRor <real> :CALCulate:EVM:LIMit:FERRor ? |
| Example | CALC:EVM:LIM:FERR 15 CALC:EVM:LIM:FERR? |
| Couplings | If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) and Center Frequency is above 5GHz, freq error limit will be coupled to 20.0ppm |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 802.11ac or 802.11ah: 20.00 ppm If Radio Std is 802.11b/g (DSSS/CCK/PBCC), 801.11g (DSSS-OFDM): 25.00 ppm If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) : 25.0ppm |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 500 ppm |
| Initial S/W Revision | A.10.01 |

Clock Error

Sets a clock error limit to warn you if the measured maximum clock error value exceeds the limit.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Limits |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CLKerror <real> :CALCulate:EVM:LIMit:CLKerror ? |
| Example | CALC:EVM:LIM:CLK 15 CALC:EVM:LIM:CLK? |
| Couplings | If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) and Center Frequency is above 5GHz, freq error limit will be coupled to 20.0ppm |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 802.11ac or 802.11ah: 20.00 ppm If Radio Std is 802.11b/g (DSSS/CCK/PBCC), 801.11g (DSSS-OFDM): 25.00 ppm If Radio Std is 802.11n (20 MHz) or 802.11n (40 MHz) : 25.0ppm |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100 ppm |
| Initial S/W Revision | A.10.01 |

Center Freq Leakage

Sets Center Freq Leakage limit to warn you if the measured average Center Freq Leakage exceeds the limit.

| Key Path | Meas Setup, Limits |
|-------------------------------------|--|
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:LIMit:CFLeakage <rel_ampl> :CALCulate:EVM:LIMit: CFLeakage? |
| Example | CALC:EVM:LIM:CFL -15 CALC:EVM:LIM:CFL? |
| Preset | If Radio Std is 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n (20 MHz): -15dB If Radio Std is 802.11n (40 MHz): -20 dB If Radio Std is 802.11ac: $-10\log_{10}(N)$ (N is fft length) 11ac20M: -18dB 11ac40M: -21dB 11ac80M: -24dB 11ac160M: -27dB If Radio Std is 802.11ah: $-10\log_{10}(N)$ (N is fft length) 11ah 1M: -15dB 11ah 2M: -18dB 11ah 4M: -21dB 11ah 8M: -24dB 11ah 16M: -27dB |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 0 |
| Backwards Compatibility SCPI | :CALCulate:EVM:LIMit:IQOffset <rel_ampl> |
| Initial S/W Revision | A.10.01 |

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

| | |
|----------------------|-------------------|
| Key Path | Meas Setup |
| Initial S/W Revision | A.10.01 |

Pilot Tracking

802.11 OFDM performs demodulation relative to the data in pilot carriers embedded in the signal. These pilot carriers replace data-carrying elements of the signal and allow some kinds of impairments to be removed or “tracked out”.

Many impairments will be common to all pilot carriers and can be measured and displayed as “common pilot error”.

In addition, several specific tracking functions can be individually switched on and off in the demodulation performed by this measurement. This is a very useful troubleshooting approach, since modulation errors can be examined with and without the benefit of particular types of pilot tracking.

| | |
|----------------------|-----------------------------|
| Key Path | Meas Setup, Advanced |
| Initial S/W Revision | A.10.01 |

Track Amplitude

Track Amplitude specifies whether the analyzer tracks amplitude changes in the pilot subcarriers. When Track Amplitude is selected, the analyzer applies pilot subcarrier amplitude error correction to the pilot and data subcarriers. This is in addition to Track Phase and Track Timing error correction, if selected.

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PIlot:TRACk:AMPLitude OFF ON 0 1 :CALCulate:EVM:PIlot:TRACk:AMPLitude? |
| Example | CALC:EVM:PIL:TRAC:AMPL 1 CALC:EVM:PIL:TRAC:AMPL? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TRACk:AMP OFF ON 0 1 [:SENSe] :EVM:TRACk:AMP? |
| Initial S/W Revision | A.10.01 |

Track Phase

The Track Phase parameter specifies whether the analyzer tracks phase changes in the pilot subcarriers. When Track Phase is selected, the analyzer applies pilot subcarrier phase error correction to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Timing error correction if selected.

| | |
|-----------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PILot:TRACk:PHASe OFF ON 0 1 :CALCulate:EVM:PILot:TRACk:PHASe? |
| Example | CALC:EVM:PIL:TRAC:PHAS 0 CALC:EVM:PIL:TRAC:PHAS? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Track Timing

The Track Timing parameter specifies whether the analyzer tracks timing changes in the pilot subcarriers. When Track Timing is selected the analyzer applies pilot subcarrier timing error correction (frequency offset correction) to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Phase error correction if selected.

| | |
|-------------------------------------|---|
| Key Path | Meas Setup, Advanced, Pilot Track |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:PILot:TRACk:TIMing OFF ON 0 1 :CALCulate:EVM:PILot:TRACk:TIMing? |
| Example | CALC:EVM:PIL:TRAC:TIM 1 CALC:EVM:PIL:TRAC:TIM? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:TRACk:TIMing |
| Initial S/W Revision | A.10.01 |

Sync Training Sequence

This parameter specifies synchronization method to use when synchronizing to the start of the OFDM burst.

A value of Short means to search for and synchronize to an 802.11a/g/j/p (OFDM) preamble short symbol sequence.

A value of Long means to search for and synchronize to an 802.11a/g (OFDM) preamble long symbol sequence (also called the channel estimation sequence).

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, More, Advanced |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:STSequence LONG SHORt [:SENSe] :EVM:STSequence? |
| Example | EVM:STS LONG EVM:STS? |
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM) measurement, otherwise it will be grayed out. Forceful message “-221 Setting Conflict, Sync Training Sequence is not available for current Radio Setting” |
| Preset | SHORt |
| State Saved | Saved in instrument state. |
| Backwards Compatibility SCPI | [:SENSe] :EVM:SYNCseq LONG SHORt [:SENSe] :EVM:SYNCseq? |
| Initial S/W Revision | A.10.01 |

Equalizer Training

This specifies how the equalizer is initialized, or “trained”. The valid values are Channel Estimation Seq Only and Channel Estimation Seq & Data. The value Channel Estimation Seq Only, which is the default, specifies that the equalizer is trained using only the channel estimation sequence (also called the “long sync”) portion of the burst preamble. The 802.11a/g/n standards imply that the equalizer should be implemented this way when measuring EVM, and this matches how a real receiver would probably implement an equalizer.

The value and Channel Estimation Seq & Data specifies that the equalizer should be trained using both the channel estimation sequence and the entire data portion of the burst. This usually gives a more accurate estimate of the equalizer response. It also typically lowers the EVM by between one and three dB.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:EQUalizer:TMODe SEQuence SDATa :CALCulate:EVM:EQUalizer:TMODe? |
| Example | CALC:EVM:EQU:TMOD SDAT CALC:EVM:EQU:TMOD? |

| | |
|-------------------------------------|---|
| Notes | Only used in 802.11a/g/j/p (OFDM), 801.11g (DSSS-OFDM), 802.11n, 802.11ac or 802.11ah measurement |
| Preset | SEQ |
| State Saved | Saved in instrument state. |
| Range | Channel Est Seq Only Channel Est Seq&Data |
| Readback Text | Channel Est Seq Only Channel Est Seq & Data |
| Backwards Compatibility SCPI | [:SENSe] :EVM:EQUalizer:TRAIning SEQUence SDATa [:SENSe] :EVM:EQUalizer:TRAIning? |
| Initial S/W Revision | A.10.01 |

I/Q Normalize

This parameter specifies if the I/Q signals will be normalized.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Advanced |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:IQNorm OFF ON 0 1 :CALCulate:EVM:IQNorm? |
| Example | CALC:EVM:IQN ON CALC:EVM:IQN? |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Backwards Compatibility SCPI | [:SENSe] :EVM:IQNorm OFF ON 0 1 [:SENSe] :EVM:IQNorm? |
| Initial S/W Revision | A.10.01 |

I/Q Compensation

This parameter allows to turn On or Off the compensation for IQ Gain Imbalance, IQ Quadrature Error, and IQ Timing Skew found in the input signal.

| | |
|-----------------------|--|
| Key Path | Meas Setup, Advanced, More |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVM:COMPensate OFF ON 0 1 [:SENSe] :EVM:COMPensate? |
| Example | EVM:COMP ON EVM:COMP? |
| Notes | If the Radio Std is not 802.11n, it will be grayed out .Forceful message “-221 Setting confict, IQ |

| | |
|----------------------|--|
| | Compensation is not available for current Radio Setting" |
| Preset | Off |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | A.10.01 |

Spectrum

Sets a spectrum to either normal or to inverted for demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

The invert function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or a low side mix.

| | |
|-------------------------------------|--|
| Key Path | Meas Setup, Advanced, More |
| Mode | WLAN |
| Remote Command | :CALCulate:EVM:SPECTrum INVert NORMal :CALCulate:EVM:SPECTrum? |
| Example | CALC:EVM:SPEC INV CALC:EVM:SPEC? |
| Preset | NORMal |
| State Saved | Saved in instrument state. |
| Range | Normal Invert |
| Backwards Compatibility SCPI | [:SENSe] :EVM:MIRRorspec OFF ON 0 1 [:SENSe] :EVM:MIRRorspec? |
| Initial S/W Revision | A.10.01 |

Matrix Type

This parameter specifies the Matrix Type.

| | |
|-----------------------|--|
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVMmimo:MTYPe DMAP FOURier [:SENSe] :EVMmimo:MTYPe? |
| Example | EVMM:MTYP DMAP EVMM:MTYP? |
| Preset | FOURier |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | Direct Fourier |
| Initial S/W Revision | A.14.00 |

MIMO Type

This parameter specifies the MIMO Type.

| | |
|-----------------------|---|
| Key Path | Meas Setup |
| Mode | WLAN |
| Remote Command | [:SENSe] :EVMMimo:TYPe M2M2 M3M3M4M4 [:SENSe] :EVMMimo:TYPe? |
| Example | EVMM:TYP M3M3 EVMM:TYP? |
| Notes | There are constraints on remote analyzer configuration for selected MIMO type in E6640A. If it's MIMO 2x2, then valid remote analyzer connection is TRX1 (Master) + TRX2 (Slave) or TRX3 (Master) + TRX4 (Slave) 2-channel configuration. If it's MIMO 3x3, then valid remote analyzer connection is TRX1 (Master) + TRX2 (Slave) + TRX3 (Slave) 3-Channel configuration. If it's MIMO 4x4, then valid remote analyzer connection is TRX1 (Master) + TRX2 (Slave) + TRX3 (Slave) + TRX4 (Slave) 4-Channel configuration. This check is imposed when doing MIMO EVM measurement. If invalid remote configuration for current MIMO type is detected, then popup error "Setting Conflict; Invalid remote configuration for current MIMO type". |
| Preset | M2M2 |
| State Saved | Saved in instrument state. |
| Range | M2M2 M3M3 M4M4 |
| Initial S/W Revision | A.14.00 |

Meas Preset

Returns parameters for the current measurement to those set by the factory.

| | |
|-----------------------|-------------------------|
| Key Path | Meas Setup, More |
| Mode | WLAN |
| Remote Command | :CONFigure:EVM |
| Example | CONF:EVM |
| Initial S/W Revision | A.10.01 |

Mode

See "[Mode](#)" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 2212 for more information.

| | |
|--------------------------------------|---|
| Key Path | Front-panel key |
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPle ALL | Auto Couple front-panel key |
| Meas Preset | :CONFigure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTrument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODEs | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPUt | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGN | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTEM:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTEM:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTEM:PON:TYPE LAST | System Menu |

Mode Setup

See "[Mode Setup](#)" on page 221

Peak Search

Displays the Peak Search menu and places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

| | |
|-----------------------------|--|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum |
| Example | CALC:EVM:MARK2:MAX |
| Initial S/W Revision | Prior to A.02.00 |

Next Peak

Moves the selected marker to the peak that has the next highest amplitude that is less than the marker's current value.

| | |
|-----------------------------|---|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:NEXT |
| Example | CALC:EVM:MARK2:MAX:NEXT |
| Initial S/W Revision | Prior to A.02.00 |

Next Pk Right

Moves the selected marker to the next peak to the right of the current marker.

| | |
|-----------------------------|--|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:RIGHT |
| Example | CALC:EVM:MARK2:MAX:RIGH |
| Initial S/W Revision | Prior to A.02.00 |

Next Pk Left

Moves the selected marker to the next peak to the left of the current marker.

| | |
|-----------------------|---|
| Key Path | Peak Search |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MAXimum:LEFT |

| | |
|----------------------|-------------------------|
| Example | CALC:EVM:MARK2:MAX:LEFT |
| Initial S/W Revision | Prior to A.02.00 |

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. This sets the control mode for the selected marker to Delta mode. The softkey enables you to conveniently perform a peak search and change the marker's control mode to Delta without having to access two separate menus.

| | |
|----------------------|--------------------|
| Key Path | Peak Search |
| Initial S/W Revision | Prior to A.02.00 |

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

| | |
|-----------------------|--|
| Key Path | Peak Search, More |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:PTPeak |
| Example | CALC:EVM:MARK:PTP |
| Notes | Turns on the Marker Δ active function. |
| Dependencies | This key is not available when Coupled Markers is on. |
| Initial S/W Revision | Prior to A.02.00 |

Min Search

Moves the selected marker to the minimum y-axis value of the current trace.

| | |
|-----------------------|--|
| Key Path | Peak Search, More |
| Mode | WIMAXOFDMA |
| Remote Command | :CALCulate:EVM:MARKer[1] 2 ...12:MINimum |
| Example | CALC:EVM:MARK:MIN |
| Initial S/W Revision | Prior to A.02.00 |

Print

See "Print " on page 277

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode’s settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled State Register <register number>” is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 2222.

| Key Path | Recall |
|-----------------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

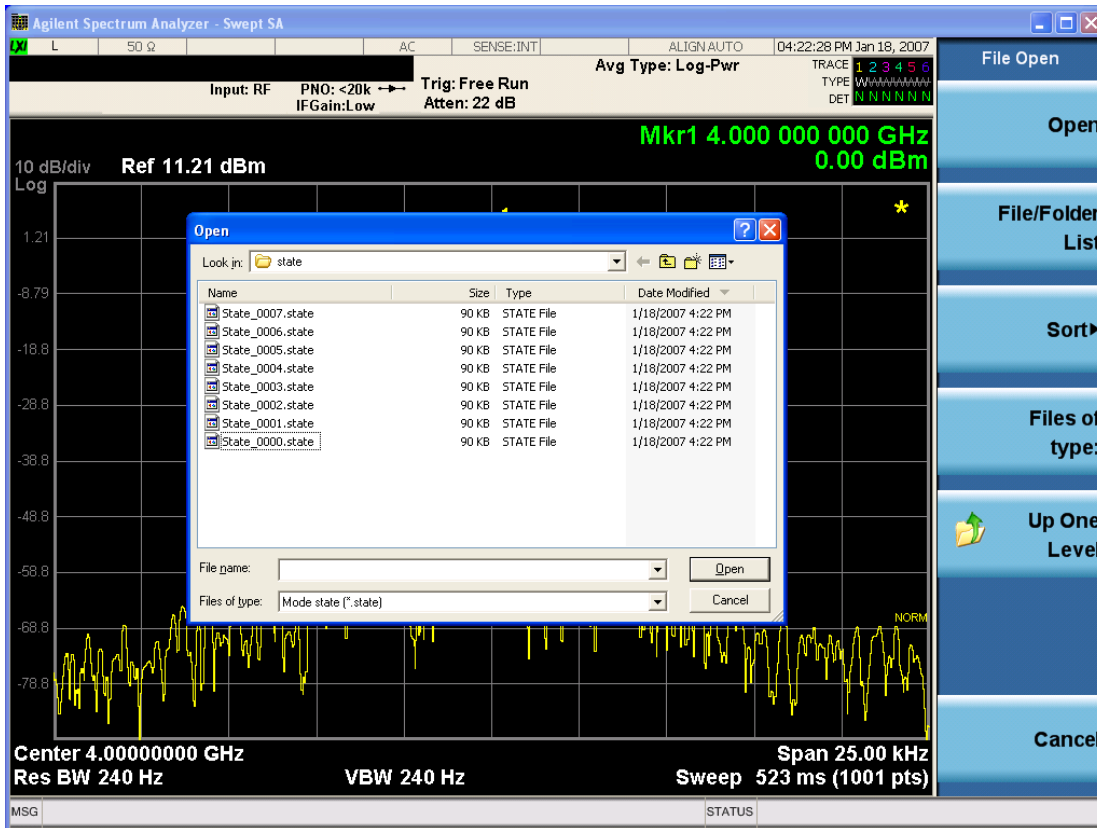
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| Key Path | Recall, State |
|--------------------------|---|
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|---|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR "(empty)" if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEquences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| Key Path | Recall, Data |
|----------------------|--|
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| Key Path | Recall |
|----------------------|--|
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMoRY:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 2230

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTegrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|-----------------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

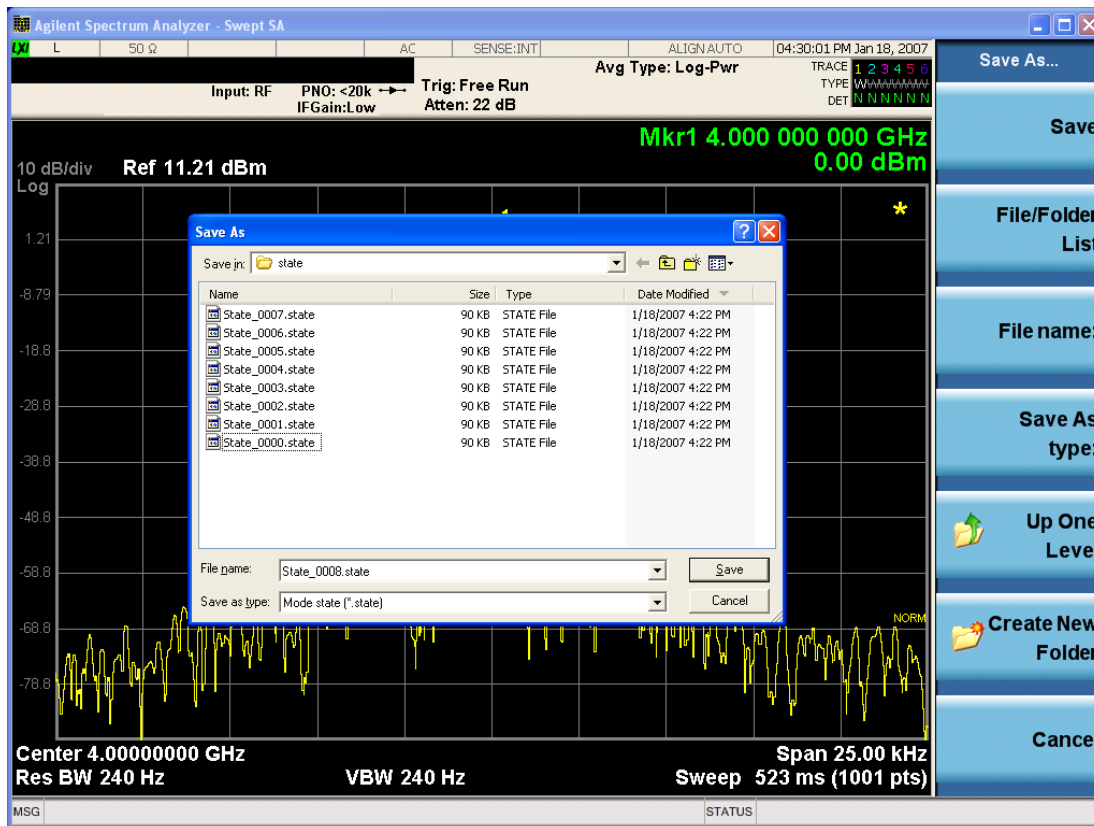
| | |
|-----------------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMoRY:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can **Cancel** the request. If you select **OK**, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See "[More Information](#)" on page 2235

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

| | |
|----------------------|---|
| | <p>The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Remove Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:RDIrectory <directory_name> |
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|-----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Remote Command | :MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt" |
| Example | :MMEM:STOR:SEQ:SLISt "MySequence.txt" |
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none"> -CSV (Comma delimited) (*.csv) -Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|----------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|----------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "To File . . ." on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

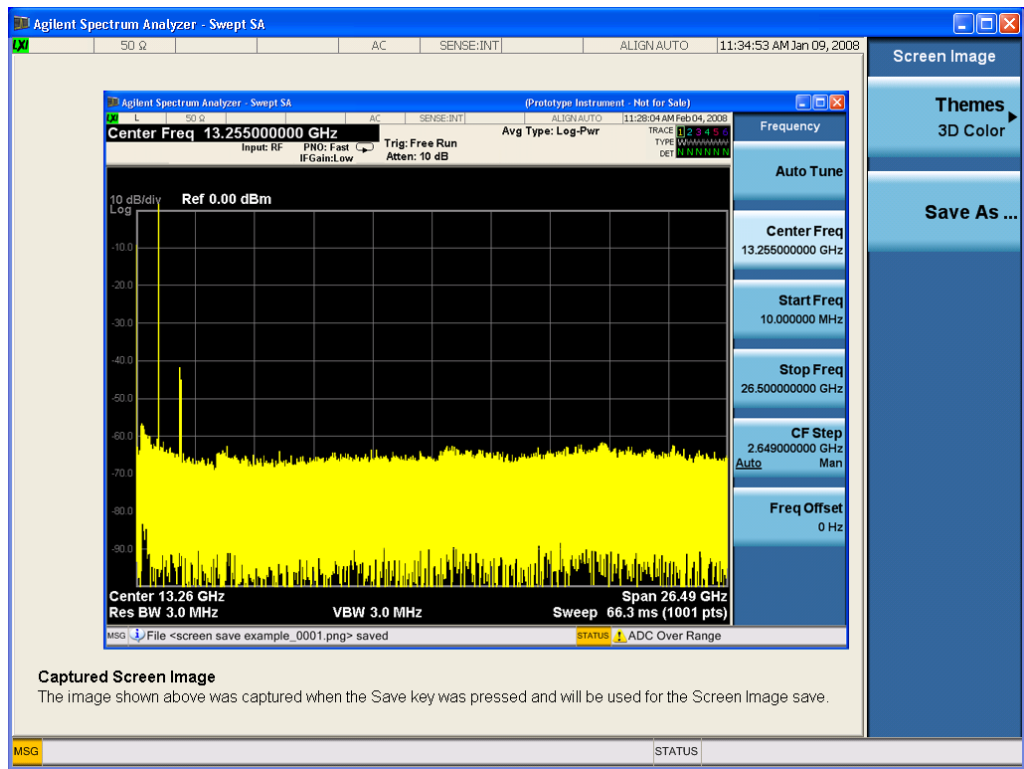
| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCOLOR FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 2247

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------------|---|
| Remote Command | :OUTPut[:EXTErnal][:STATe] ON OFF 1 0 :OUTPut[:EXTErnal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|-----------------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 2250](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 2250 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 2250 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

$$\text{Output power} = \text{reference power} - \text{entered power}$$

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| | |
|----------------------|---|
| Key Path | Source, Amplitude |
| Dependencies | This key is unavailable, and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|---|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW] ? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 2254](#),

"W-CDMA Channel Number Ranges" on page 2255, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 2256, and "LTE FDD Channel Number Ranges" on page 2258.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|----------------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| Band IX | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| Band X | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| | | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | Downlink | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| Band XI | Uplink | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| | | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Downlink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| | | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| Band XII | Uplink | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| Band XIII | Uplink | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | Downlink | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| | | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| Band XIV | Uplink | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | Downlink | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| | | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| Band XIX | Uplink | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | Downlink | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |
| | | | |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 * N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|-----------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Uplink (MS, reverse link) | | |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | | 2110 | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | | 1930 | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | | 1805 | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | | 2110 | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | | 869 | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | | 875 | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | | 2620 | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | | 925 | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | | 1844.9 | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | | 2110 | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | | 1475.9 | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | | 729 | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | | 746 | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | | 758 | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | | 734 | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | | 860 | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 – 6149 | 830 | 24000 | 24000 – 24149 |
| 20 | 791 | 6150 | 6150 – 6449 | 832 | 24150 | 24150 – 24449 |
| 21 | 1495.9 | 6450 | 6450 – 6599 | 1447.9 | 24450 | 24450 – 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 – 8039 | 1626.5 | 25700 | 25700 – 26039 |
| 25 | 1930 | 8040 | 8040 – 8689 | 1850 | 26040 | 26040 – 26689 |
| 26 | 859 | 8690 | 8690 – 9039 | 814 | 26690 | 26690 – 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 – 36199 | 1900 | 36000 | 36000 – 36199 |
| 34 | 2010 | 36200 | 36200 – 36349 | 2010 | 36200 | 36200 – 36349 |
| 35 | 1850 | 36350 | 36350 – 36949 | 1850 | 36350 | 36350 – 36949 |
| 36 | 1930 | 36950 | 36950 – 37549 | 1930 | 36950 | 36950 – 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|---------------|
| 37 | 1910 | 37550 | 37550 - 37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 - 38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 - 38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 - 39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

Table: UTRA Absolute Radio Frequency Channel Number 1.28 Mcps TDD Option

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900-1920 MHz | 9504 to 9596 |
| | 2010-2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850-1910 MHz | 9254 to 9546 |
| | 1930-1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910-1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570-2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300-2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880-1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURCE:FREQUENCY:CHANNELS:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|----------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menu.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|-----------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|-----------------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|-----------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|-----------------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} - \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source > Frequency > Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source > Frequency > Frequency and set as the reference frequency

entered frequency equals a new value entered under Source > Frequency > Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| Key Path | Source, Frequency |
|-----------------------|--|
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| Key Path | Source |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFAult:DIRectory <string> :SOURce:RADio:ARB: DEFAult:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 2540.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|---|
| | <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm" |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CBWidth <freq> :SOURce:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:BANDwidth <freq> :SOURce:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWer:CONTrol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTrol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGle SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613.](#)

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614.](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540.](#)

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command :SOURce:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 2312](#) "For Setup SCPI".)

:SOURce:RADio:ARB:SEQuence[:MWAveform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 2313](#) below.)

Example For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1 M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

| | |
|----------------------|--|
| | If you do not specify a filename, an error is generated. If the waveform sequence file name is empty, an error is generated. If the specified waveform sequence file cannot be found, an error is generated. |
| Initial S/W Revision | A.05.00 |

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|----------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses

Remote Command :SYSTem:LKEY:WAVeform:LOCK <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>

Example SYST:LKEY:WAV:LOCK 1
or
SYST:LIC:WAV:LOCK 1

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command :SYSTem:LKEY:WAVeform:STATus? <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>

Example :SYST:LKEY:WAV:STAT? 1
<"Locked"
or
:SYST:LIC:WAV:STAT? 1
<"Locked"

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"> |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|-----------------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| Key Path | Source, List Sequencer |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|---|
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|----------------------|--|
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|---|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| Key Path | Source, List Sequencer, List Sequencer Setup |
|-----------------------|--|
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> – specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPI front panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:DEFault:DIRectory <string>
 :SOURce:RADio:ARB: DEFault:DIRectory?

Example :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"
 :SOUR:RAD:ARB:DEF:DIR?

State Saved Persistent, survives a power cycle and a preset but not saved in the instrument state

Initial S/W Revision A.05.00

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path **Source, Modulation Setup, ARB, Select Waveform**

Initial S/W Revision A.05.00

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOut? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTERNAL KEY BUS EXTERNAL2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMediate INTernal KEY BUS EXTernal2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

R :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...

e :SOURce:LIST:SETup:RADio:BAND?
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a
n
d

E :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM

x :SOUR:LIST:SET:RAD:BAND?
a
m
p
l

e

N The command is to setup below parameter array of whole list sequence.

O Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 2591](#).

t If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then
e generate error ", and only those parametes whose index number falls in number of steps will be updated.
s

R NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI
e V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO
m REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|
o BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1
t 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN
e D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on
e page 2587](#).

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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFfrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFfrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|--|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|---|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|--|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTInuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
:SOURce:LIST:SETup:TOCount?

Example :SOUR:LIST:SET:TOC 1s,2s,3s
:SOUR:LIST:SET:TOC?
:SOUR:LIST:SET:TOC 5,6,7
:SOUR:LIST:SET:TOC?

Notes The command is to setup below parameter array of whole list sequence.
Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 2616](#) and ["Play Count" on page 2617](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
If current ["Step Duration" on page 2616](#) is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"

Dependencies The range is 1 to 1000 which is determined by the number of steps you have configured. For details see ["Number of Steps" on page 2587](#).

Initial S/W Revision A.09.40

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

Remote Command :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
:SOURce:LIST:SETup:OUTPut:TRIGger ?

Example :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON
:SOUR:LIST:SET:OUTP:TRIG?

Notes The command is to setup below parameter array of whole list sequence.
Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 2618](#).
If input parameter number exceeds the step number defined by ["Number of Steps" on page 2587](#) Number of Steps then generate error ", and only those parametes whose index number falls in

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

Sweep/Control

Accesses a menu that allows you to select parameters that affect the sweep of the displayed measurement signal.

Only the Pause/Resume key is available.

See "[Sweep/Control](#)" on page 2634 for more information.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.10.01 |

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

| Key Path | Sweep/Control |
|-----------------------|--|
| Remote Command | :INITiate:PAUSE |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

| Key Path | Sweep/Control |
|-----------------------|--|
| Remote Command | :INITiate:RESume |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

System

See "System" on page 278

Trace/Detector

To support 2X2, 3X3 and 4X4 MIMO, since more than 4 traces may occur in some measurement view, 3 new softkeys are added in the Trace/Detector menu for WLAN EVM MIMO measurement only.

| Key Path | Front-panel key |
|----------------------|-----------------|
| Initial S/W Revision | A.14.00 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

RF Burst

See ["RF Burst " on page 1267](#)

Absolute Trigger

See ["Absolute Trigger Level" on page 1268](#)

Relative Trigger

See ["Relative Trigger Level" on page 1257](#)

Trig Slope

See "[Trigger Slope](#)" on page 1269

Trig Delay

See "[Trig Delay](#)" on page 354

Auto/Holdoff

See "[Auto/Holdoff](#)" on page 1270

Auto Trig

See "[Auto Trig](#)" on page 1270

Trig Holdoff

See "[Trig Holdoff](#)" on page 1271

Holdoff Type

See "[Holdoff Type](#)" on page 367

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

15 Waveform Measurement

The waveform measurement is a generic measurement for viewing the input signal waveforms in the time domain. This measurement represents how the instrument performs the zero span functionality found in traditional spectrum analyzers. For more details, see ["Waveform Measurement Description" on page 2392](#) below.

This topic contains the following sections:

["Measurement Commands for Waveform" on page 2390](#)

["Remote Command Results for the Waveform Measurement" on page 2391](#)

Measurement Commands for Waveform

The general functionality of CONFigure, INITiate, FETCh, MEASure, and READ are described at this section.

:CONFigure:WAVeform

:CONFigure:WAVeform:NDEFault

:INITiate:WAVeform

:FETCh:WAVeform[n]?

:MEASure:WAVeform[n]?

:READ:WAVeform[n]?

For more measurement related commands, see the SENSE subsystem, and the section "[Remote Measurement Functions](#)" on page 2430.

Remote Command Results for the Waveform Measurement

The following table denotes the returned results from the FETCh|MEASure|READ commands:

| n | Results Returned |
|---|--|
| 0 | Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values. |
| 1 | <p>Returns the following scalar results:</p> <ol style="list-style-type: none"> 1. Sample Time is a floating point number representing the time between samples when using the trace queries (n=0, 2, and so forth). 2. Mean Power is the mean power (in dBm). This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. 3. Mean Power Averaged is the power (in dBm) for N averages, if averaging is on. This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.). 5. Peak-to-mean ratio has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peak-to-mean ratio is calculated using the highest peak value, rather than the displayed average peak value. 6. Maximum value is the maximum of the most recently acquired data (in dBm). 7. Minimum value is the minimum of the most recently acquired data (in dBm). |
| 2 | Returns trace point values of the entire captured signal envelope trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. |

Waveform Measurement Description

Also available under the basic Waveform measurement is an I/Q window, which shows the I and Q signal waveforms in parameters of voltage versus time to disclose the voltages that comprise the complex modulated waveform of a digital signal.

The waveform measurement can also be used to perform general purpose power measurements to a high degree of accuracy.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Ref Value (RF Envelope View)

Sets the Y Scale reference value (in dBm) when the RF Envelope View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RLEVel <ampl> :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RLEVel? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:RLEV -50 dBm DISP:WAV:VIEW:WIND:TRAC:Y:RLEV? |
| Notes | You must be in the mode that includes Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dBm |
| State Saved | Saved in instrument state. |
| Range | -250.00 dBm to 250.00 dBm |
| Min | -250.00 dBm |
| Max | 250.00 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

| | |
|-----------------------|----------------------------------|
| Key Path | Range |
| Mode | BASIC |
| Remote Command | [:SENSe]:POWer[:RF]:RANGe <real> |

| | |
|-----------------------------|---|
| | <code>[:SENSe] :POWer [:RF] :RANGe?</code> |
| Example | <code>:POW:RANG 10.0</code> <code>:POW:RANG?</code> |
| Notes | The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.) |
| Preset | 0 |
| State Saved | Saved in instrument state. |
| Min | -100 |
| Max | 100 |
| Initial S/W Revision | A.12.50 |

Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

| | |
|---------------------------------|--|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize IMMEDIATE</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale, Attenuation |
| Remote Command | <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize:ATTenuation OFF ON ELEctrical COMBined</code> <code>[:SENSe] :POWer [:RF] :RANGe:OPTimize:ATTenuation?</code> |
| Notes | This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned. |
| Preset | OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip |
| State Saved | Saved in instrument state |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

| | |
|-----------------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :PARatio?</code> |
| Example | POW:RANG:PAR 12 dB |
| Notes | In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated. |
| Preset | 10 dB |
| State Saved | Saved in instrument state |
| Min | 0 dB |
| Max | 20 dB |
| Initial S/W Revision | A.13.00 |

Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

| | |
|-----------------------------|--|
| Key Path | AMPTD Y Scale, Range |
| Remote Command | <code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet <real></code> <code>[:SENSe] :POWeR [:RF] :RANGe :MIXer :OFFSet?</code> |
| Example | POW:RANG:MIX:OFFS -5 dB |
| Preset | 0 dB |
| State Saved | Saved in instrument state |
| Min | -35 dB |
| Max | 30 dB |
| Initial S/W Revision | A.13.00 |

Scale/Div (RF Envelope View)

Sets the scale per division for the RF Envelope result waveform (time domain) measurements in the graph window.

| | |
|---------------------------------|--|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ ampl> :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:PDIV 5 DISP:WAV:VIEW:WIND:TRAC:Y:PDIV? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dB |
| State Saved | Saved in instrument state. |
| Range | 0.10 dB to 20.00 dB |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Position (RF Envelope View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTer BOTTom :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW:WIND:TRAC:Y:RPOS? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |

| | |
|--------------------------|----------------------------|
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the **Restart** front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

| Key Path | AMPTD Y Scale |
|--------------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 1 OFF ON :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:Y[:SCALe]:COUPle? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:COUP OFF DISP:WAV:VIEW:WIND:TRAC:Y:COUP? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically switches the scale per division and reference values into the defaults. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | OFF |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Value

Sets the absolute power reference value. However, since Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

This functionality depends on the selected view:

- ["Ref Value \(RF Envelope View\)" on page 2398](#)
- ["Ref Value \(I/Q Waveform View\)" on page 2398](#)

Ref Value (RF Envelope View)

Sets the Y Scale reference value (in dBm) when the RF Envelope View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

| | |
|---------------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <ampl> :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:RLEV -50 dBm DISP:WAV:VIEW:WIND:TRAC:Y:RLEV? |
| Notes | You must be in the mode that includes Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dBm |
| State Saved | Saved in instrument state. |
| Range | -250.00 dBm to 250.00 dBm |
| Min | -250.00 dBm |
| Max | 250.00 dBm |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Value (I/Q Waveform View)

Sets the Y Scale reference value (in volts) when the I/Q Waveform View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDB-T, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <voltage> :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel? |
| Example | DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV 25 V DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |

| | |
|--------------------------|----------------------------|
| Preset | 0 V |
| State Saved | Saved in instrument state. |
| Min | -250 V |
| Max | 250 V |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Scale/Div

Sets the units per division of vertical scale in the logarithmic display. However, since Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

This functionality depends on the selected view:

- ["Scale/Div \(RF Envelope View\)" on page 2399](#)
- ["Scale/Div \(I/Q Waveform View\)" on page 2400](#)

Scale/Div (RF Envelope View)

Sets the scale per division for the RF Envelope result waveform (time domain) measurements in the graph window.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ ampl> :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision? |
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:PDIV 5 DISP:WAV:VIEW:WIND:TRAC:Y:PDIV? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 10.00 dB |
| State Saved | Saved in instrument state. |
| Range | 0.10 dB to 20.00 dB |
| Min | 0.10 dB |
| Max | 20.00 dB |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Scale/Div (I/Q Waveform View)

Sets the scale per division for the I/Q signal waveform graph.

| | |
|---------------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <voltage> :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision? |
| Example | DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV 25mV DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off. |
| Preset | 100.0 mV |
| State Saved | Saved in instrument state. |
| Min | 1.0 nV |
| Max | 20 V |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

This functionality depends on the selected view:

- ["Ref Position \(RF Envelope View\)" on page 2400](#)
- ["Ref Position \(I/Q Waveform View\)" on page 2401](#)

Ref Position (RF Envelope View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

| | |
|-----------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP CENTer BOTTom :DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? |

| | |
|--------------------------|--|
| Example | DISP:WAV:VIEW:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW:WIND:TRAC:Y:RPOS? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRUMENT:SElect to set the mode. |
| Preset | TOP |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ref Position (I/Q Waveform View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

| | |
|--------------------------|---|
| Key Path | AMPTD Y Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALE]:RPOSition TOP CENTER BOTTom :DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALE]:RPOSition? |
| Example | DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRUMENT:SElect to set the mode. |
| Preset | CENT |
| State Saved | Saved in instrument state. |
| Range | Top Ctr Bot |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 2402](#)

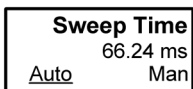
| | |
|-----------------------------|--|
| Key Path | Front-panel key |
| Remote Command | :COUPLe ALL NONE |
| Example | :COUP ALL |
| Notes | :COUPLe ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

There are two types of functions that have Auto/Manual modes.

Auto/Man Active Function keys

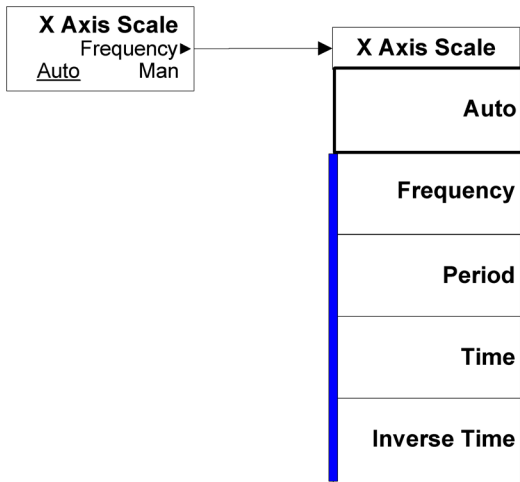
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between **Auto** (where the parameter is automatically coupled to the other parameters it is dependent upon) and **Man** (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either **Auto** or **Man** underlined as illustrated below.



vsd07

Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



vsd08

BW

Accesses a menu that enables you to control the information bandwidth functions of the instrument. You can also select the filter type for the measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Digital IF BW

Enables you to set the Digital IF (formerly Info BW) bandwidth of the instrument.

| | |
|-----------------------------|--|
| Key Path | BW |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TD-SCDMA, 1xEVDO, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | [:SENSe] :WAVeform:DIF:BA NDwidth <freq> [:SENSe] :WAVeform:DIF:BA NDwidth? |
| Example | WAV:DIF:BA ND 1 kHz WAV:DIF:BA ND? |
| Remote Command Notes | You must be in a mode that includes the Waveform measurements to use this command. Use INSTRument:SElect to set the mode. |
| Dependencies | The maximum value is the maximum Digital IF BW available in the instrument. With Option B85 the maximum value is 85 MHz, with Option B1Y the maximum value is 160 MHz. |
| Preset | All except the following list: 100 kHz GSM/EDGE: 510 kHz TDSCDMA: 1.3 MHz 1xEVDO: 1.3 MHz DVB-T/H: 8.0 MHz DTMB (CTTB): 8.0 MHz ISDB-T: 6.0 MHz CMMB: 8.0 MHz Digital Cable TV: 8 MHz LTEAFDD, LTEATDD: 6 MHz LTETDD: 6 MHz LTE: 6 MHz WLAN: Hardware Dependent No option = 10 MHz Option B25 = 25 MHz Option B40: if Radio Std is 802.11a/b/g/n(20MHz) = 25 MHz |

| | |
|-------------------------------------|---|
| | if Radio Std is 802.11n(40MHz) = 40 MHz if Radio Std is 802.11ac(20MHz) = 25 MHz if Radio Std is 802.11ac(40MHz) = 40 MHz Option B1X: if Radio Std is 802.11ac(80MHz) = 80 MHz Option B1Y: if Radio Std is 802.11ac(160MHz) = 160 MHz |
| State Saved | Saved in instrument state. |
| Min | 10 Hz |
| Max | Hardware Dependent: RF Input: No Option = 10 MHz Option B25 = 25 MHz Option B40 = 40 MHz Option B85 = 85.0 MHz Option B1A = 125.0 MHz Option B1X = 140 MHz Option B1Y = 160 MHz |
| Backwards Compatibility SCPI | <code>[:SENSe] :WAVeform :BANDwidth [:RESolution]</code> <code>[:SENSe] :WAVeform :BWIDth [:RESolution]</code> |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.13.00 |

Filter Type

Selects the type of bandwidth filter that is used.

Besides the Gaussian filter shape, a variety of other filter types are available with variable alpha settings for maximum control over the filter shape..

| | |
|-----------------------|---|
| Key Path | BW |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,,LTEATDD, LTEAFDD |
| Remote Command | <code>[:SENSe] :WAVeform :DIF :FILTer :TYPE GAUSSian FLATtop</code> <code>[:SENSe] :WAVeform :DIF :FILTer :TYPE?</code> (With DIF40 and/or WBDIF) <code>[:SENSe] :WAVeform :DIF :FILTer :TYPE GAUSSian FLATtop SNYQuist RSNYquist RCOSine RRCosine</code> <code>[:SENSe] :WAVeform :DIF :FILTer :TYPE?</code> |
| Example | <code>WAV:DIF:FILT:TYPE GAUS</code> <code>WAV:DIF:FILT:TYPE?</code> |

| | |
|-------------------------------------|---|
| Remote Command Notes | You must be in a mode that includes the Waveform measurements to use this command. Use INSTRUMENT:SELEct to set the mode. |
| Dependencies | Gaussian and Flattop are available in all DIF configurations. For the other filter types, the filters are only available when Option DP2, B40, or wider IF Bandwidth option is installed. |
| Preset | BASIC with DP2, B40, or wider IF Bandwidth option: FLATtop All other apps: GAUSSian |
| State Saved | Saved in instrument state. |
| Range | Gaussian FlatTop When Option DP2, B40, or wider IF Bandwidth option is installed, the range is as follows. Gaussian FlatTop Short nyquist Root Short Nquist Raised Cosine Root RaisedCosine |
| Backwards Compatibility SCPI | [:SENSe] :WAVeform :BANDwidth :SHAPE [:SENSe] :WAVeform :BWIDth :SHAPE [:SENSe] :WAVeform :BANDwidth BWIDth [:RESolution] :TYPE |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.13.00 |

Filter BW

This feature is only available when Option DP2, B40, or wider IF Bandwidth option is installed.

| | |
|-----------------------|--|
| Key Path | BW |
| Mode | BASIC |
| Remote Command | [:SENSe] :WAVeform :DIF :FILTer :BANDwidth <freq> [:SENSe] :WAVeform :DIF :FILTer :BANDwidth? [:SENSe] :WAVeform :DIF :FILTer :BANDwidth :AUTO ON OFF 1 0 [:SENSe] :WAVeform :DIF :FILTer :BANDwidth :AUTO? |
| Example | WAV:DIF:FILT:BAND 1MHz WAV:DIF:FILT:BAND? WAV:DIF:FILT:BAND:AUTO 0 WAV:DIF:FILT:BAND:AUTO? |
| Notes | You must be in the IQ Analyzer (Basic) mode to use this command. Use INSTRUMENT:SELEct to set the mode. |
| Dependencies | This feature is only available when Option DP2, B40, or wider IF Bandwidth option is installed. |
| Couplings | Sets the same value as the current Digital IF BW value upon a preset or when Channel Filter Bandwidth Auto is ON. |
| Preset | Same value as Digital IF BW ON |
| State Saved | Saved in instrument state. |

| | |
|----------------------|---|
| Min | 10 Hz |
| Max | Clipped to the current Digital IF BW value. |
| Initial S/W Revision | A.04.00, A.13.00 |

Filter Alpha

Sets the filter alpha for the DIF filter. This feature is only available when Option DP2, B40, or wider IF Bandwidth option is installed.

| | |
|-------------------------------------|---|
| Key Path | BW |
| Mode | BASIC |
| Remote Command | [:SENSe] :WAVeform:DIF:FILTer:ALPHa <real> [:SENSe] :WAVeform:DIF:FILTer:ALPHa? |
| Example | WAV:DIF:FILT:ALPH 0.5 WAV:DIF:FILT:ALPH? |
| Notes | You must be in the IQ Analyzer (Basic) mode to use this command. Use INSTRument:SElect to set the mode. |
| Dependencies | This feature is only available when Option DP2, B40, or wider IF Bandwidth option is installed. |
| Preset | 0.2 |
| State Saved | Saved in instrument state. |
| Min | 0.01 |
| Max | 1.00 |
| Backwards Compatibility SCPI | [:SENSe] :WAVeform:WBIF:FILTer:ALPHa |
| Modified at S/W Revision | A.13.00 |

Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

| Key Path | Front-panel key |
|--------------------------------------|--|
| Remote Command | :INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous? |
| Example | :INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation |
| Preset | ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF) |
| State Saved | Saved in instrument state |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold . The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON) switches to continuous measurement, but never restarts a measurement and never resets a sweep. |
| Initial S/W Revision | Prior to A.02.00 |

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until $k = N$, at which point the current sequence will stop and the instrument will go to the idle state.

15 Waveform Measurement
File

File

See ["File" on page 272](#)

FREQ Channel

Accesses a menu of keys that allow you to control the Frequency and Channel parameters of the instrument.

Some features in the Frequency menu are the same for all measurements – they do not change as you change measurements. Settings like these are called “Meas Global” and are unaffected by Meas Preset. For example, the Center Freq setting is the same for all measurements – it does not change as you change measurements.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a **Global Settings** key in its **Mode Setup** menu.

The **Center Freq** function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 2414](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 2416](#)

See ["Center Frequency Presets" on page 2412](#)

| Key Path | FREQ Channel |
|----------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:CENTer <freq> [:SENSe] :FREQuency:CENTer? |
| Example | FREQ:CENT 50 MHz |

| | |
|----------------------|--|
| | FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT? |
| Notes | This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated. |
| Dependencies | The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit. |
| Couplings | When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range |
| Preset | Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 2412 and "RF Center Freq" on page 2414 and Ext Mix Center Freq and "I/Q Center Freq" on page 2416 . |
| State Saved | Saved in instrument state |
| Min | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 2412 and "RF Center Freq" on page 2414 and "I/Q Center Freq" on page 2416 . |
| Max | Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 2412 and "RF Center Freq" on page 2414 and "I/Q Center Freq" on page 2416 . |
| Default Unit | Hz |
| Status Bits/OPC | Non-overlapped |
| Dependencies | |
| Initial S/W Revision | Prior to A.02.00 |

Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

| Freq Option | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|-------------|-------------------------|--------------------------------|--------------------------------------|
| | | | |

| | | | |
|---------------------------------------|------------|----------|--------------|
| 503 (all but N9000A) | 1.805 GHz | 3.6 GHz | 3.7 GHz |
| 503 (N9000A) | 1.505 GHz | 3.0 GHz | 3.08 GHz |
| 507 (all but N9000A) | 3.505 GHz | 7.0 GHz | 7.1 GHz |
| 507 (N9000A) | 3.755 GHz | 7.5 GHz | 7.58 GHz |
| 508 (all but N9038A) | 1.805 GHz | 3.6 GHz | 8.5 GHz |
| 508 (N9038A) | 4.205 GHz | 8.4 GHz | 8.5 GHz |
| 513 | 6.805 GHz | 13.6 GHz | 13.8 GHz |
| 526 (all but N9000A and N9038A) | 13.255 GHz | 26.5 GHz | 27.0 GHz |
| 526 (N9000A) | 13.255 GHz | 26.5 GHz | 26.55 GHz |
| 526 (N9038A) | 1.805 GHz | 3.6 GHz | 27.0 GHz |
| 532 | 16.005 GHz | 32.0 GHz | 32.5 GHz |
| 543 | 21.505 GHz | 43.0 GHz | TBD |
| 544 | 22.005 GHz | 44.0 GHz | 44.5 GHz |
| 550 | 25.005 GHz | 50.0 GHz | 51 GHz |

Input 2:

| Model | CF after Mode Preset | Stop Freq after Mode Preset | Max Freq (can't tune above) |
|----------------|----------------------------|-----------------------------------|-----------------------------------|
| N9000A opt C75 | 0.7505GHz | 1.5 GHz | 1.58 GHz |
| N9038A | 505 MHz | 1 GHz | 1.000025 GHz |

Tracking Generator Frequency Limits (N9000A only):

| Tracking Generator Option | Min Freq (clips to this freq when turn TG on and can't tune below | If above this Freq, Stop Freq clipped to this Freq when TG turned on | Max Freq (can't tune above) while TG on |
|---------------------------------|--|---|--|
| | | | |

| | while TG on) | | |
|-----|--------------|---------|----------|
| T03 | 9 kHz | 3.0 GHz | 3.08 GHz |
| T06 | 9 kHz | 6.0 GHz | 6.05 GHz |

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

| Mode | CF Preset for RF |
|-------------|------------------|
| WCDMA | 1 GHz |
| WIMAXOFDMA, | 1 GHz |
| BASIC | 1 GHz |
| ADEMOD | 1 GHz |
| VSA | 1 GHz |
| TDSCDMA | 1 GHz |
| PNOISE | 1 GHz |
| LTE | 1 GHz |
| LTETDD | 1 GHz |
| MSR | 1 GHz |
| GSM | 935.2 MHz |
| NFIGURE | 1.505 GHz |

RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|-----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:RF:CENTer <freq> [:SENSe] :FREQuency:RF:CENTer? |
| Example | FREQ:RF:CENT 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Dependencies | If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep. |

| | |
|--------------------------|--|
| Preset | See table above |
| State Saved | Saved in instrument state. |
| Min | -79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source |
| Max | See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------|---|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:EMIXer:CENTer <freq> [:SENSe] :FREQuency:EMIXer:CENTer? |
| Example | :FREQ:EMIX:CENT 60 GHz :FREQ:EMIX:CENT? |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Couplings | When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup. |
| Preset | When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies. If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table. When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is |

| | |
|----------------------|---|
| | 33.25 GHz. Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz. |
| State Saved | Saved in instrument state. |
| Min | The minimum frequency in the currently selected mixer band + 5 Hz |
| Max | The maximum frequency in the currently selected mixer band - 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency |
| Initial S/W Revision | A.08.01 |

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the **Center Freq** function in the **Frequency** menu on the front panel always applies to the currently selected input.

| | |
|----------------------|--|
| Scope | Meas Global |
| Remote Command | [:SENSe] :FREQuency:IQ:CENTer <freq> [:SENSe] :FREQuency:IQ:CENTer? |
| Example | FREQ:IQ:CENT: 30 MHz |
| Notes | This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode. |
| Preset | 0 Hz |
| State Saved | Saved in instrument state. |
| Min | -40.049995 MHz |
| Max | 40.049995 MHz |
| Initial S/W Revision | Prior to A.02.00 |

CF Step

Changes the step size for the center frequency and start and stop frequency functions. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change the center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the analyzer.

Note that the start and stop frequencies also step by the CF Step value.

| | |
|----------------|--|
| Key Path | FREQ Channel |
| Remote Command | [:SENSe] :FREQuency:CENTer:STEP[:INCRement] <freq> |

| | |
|------------------------------|--|
| | [:SENSe]:FREQuency:CENTer:STEP[:INCRement]? |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1 |
| | [:SENSe]:FREQuency:CENTer:STEP:AUTO? |
| Example | <p>FREQ:CENT:STEP:AUTO ON</p> <p>FREQ:CENT:STEP 500 MHz</p> <p>FREQ:CENT UP increases the current center frequency value by 500 MHz</p> <p>FREQ:CENT:STEP?</p> <p>FREQ:CENT:STEP:AUTO?</p> |
| Notes | Preset and Max values are depending on Hardware Options (503, 507, 508, 513, 526) |
| Notes | Preset and Max values are dependent on Hardware Options (5xx) |
| Dependencies | Freq Offset is not available in External Mixing. In this case the Freq Offset key is grayed out and shows a value of zero. It will once again be available, and show the previously set value, when you return to the RF Input. |
| Dependencies | <p>Span, RBW, Center frequency</p> <p>If the electronic/soft attenuator is enabled, any attempt to change the value of the center frequency >3.6 GHz by pressing the Up-arrow key, fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning.</p> |
| Couplings | When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value. |
| Preset | <p>Auto</p> <p>ADEM0D: 1 MHz</p> <p>ON</p> |
| State Saved | Saved in instrument state |
| Min | – (the maximum frequency of the instrument). That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Max | The maximum frequency of the instrument. That is, 27 GHz max freq instrument has a CF step range of +/- 27 GHz. Note that this is the maximum frequency given the current settings of the instrument, so in External Mixing, for example, it is the maximum frequency of the current mixer band. |
| Default Unit | Hz |
| Status Bits/OPC dependencies | non-overlapped |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

15 Waveform Measurement
Input/Output

Input/Output

See ["Input/Output" on page 162](#)

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, the Marker X Axis Value appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

| | |
|----------------|--|
| Key Path | Marker |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer[1] 2 ... 12:MODE POSition DELTa OFF :CALCulate:WAVeform:MARKer[1] 2 ... 12:MODE? |
| Example | CALC:WAV:MARK:MODE OFF CALC:WAV:MARK:MODE? |
| Notes | If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | OFF |
| State Saved | Saved in instrument state. |

| | |
|--------------------------|------------------|
| Range | Normal Delta Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Properties

Accesses the marker properties menu.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| | |
|----------------------|------------------|
| Key Path | Marker |
| Initial S/W Revision | Prior to A.02.00 |

Relative To

Selects the marker that the selected marker is relative to (its *reference marker*).

| | |
|--------------------------|--|
| Key Path | Marker, Properties |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:WAVEform:MARKer[1] 2 ... 12:REFerence? |
| Example | CALC:WAV:MARK:REF 8 CALC:WAV:MARK:REF? |
| Notes | A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." When queried a single value is returned (the specified marker numbers relative marker). You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 2 3 4 5 6 7 8 9 10 11 12 1 |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 12 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker Trace

Assigns the specified marker to the designated trace.

| Key Path | Marker |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CM MB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer[1] 2 ... 12:TRACe RFENvelope I Q IQ :CALCulate:WAVeform:MARKer[1] 2 ... 12:TRACe? |
| Example | CALC:WAV:MARK:TRAC RFEN CALC:WAV:MARK:TRAC? |
| Notes | Assigns the specified marker to the designated trace. The IQ selection is for backward compatibility purposes. It is recommended that the users use the I and/or Q selection instead. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | RFEN |
| State Saved | Saved in instrument state. |
| Range | RF Envelope I Q IQ |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X-axis movement of every other marker which is not Off. “Equal X-axis movement” refers to the difference between each marker’s X-Axis value (in the fundamental x-axis units of the trace that marker is on) and the X-Axis value of the marker being moved (in the same fundamental x-axis units) are preserved.

| Key Path | Marker |
|----------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CM MB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:WAVeform:MARKer:COUPle[:STATe]? |
| Example | CALC:WAV:MARK:COUP ON CALC:WAV:MARK:COUP ON |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | OFF |

| | |
|--------------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

All Markers Off

Turns off all markers.

| Key Path | Marker |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer:AOff |
| Example | CALC:WAV:MARK:AOff |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is Normal or Delta.

| | |
|----------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer[1 2 ... 12]:X <time> :CALCulate:WAVeform:MARKer[1 2 ... 12]:X? |
| Example | CALC:WAV:MARK:X 50 ms CALC:WAV:MARK:X? |
| Notes | If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. If the specified marker is Fixed and a Marker Function is on, error -221 "Settings conflict; cannot adjust Fixed marker while Marker Function is on" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal , or the offset from the marker's reference marker if the control mode is Delta . The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time , seconds for Period and Time . If the marker is Off the response is not a number. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 0 |

| | |
|--------------------------|--|
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | No |
| Min | (9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

| | |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:X:POSition <real> :CALCulate:WAVEform:MARKer[1] 2 ... 12:X:POSition? |
| Example | CALC:WAV:MARK:X:POS 500 CALC:WAV:MARK:X:POS? |
| Notes | The query returns the marker's absolute X Axis value in trace points if the control mode is Normal or the offset from the marker's reference marker in trace points if the control mode is Delta . The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 0 |
| Preset | After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN). |
| State Saved | No |
| Min | (9.9E+37 |
| Max | 9.9E+37 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker Y Axis Value (Remote Command Only)

Queries the marker Y Axis value in the current marker Y Axis unit.

| | |
|------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
|------|---|

| | |
|-------------------------------------|--|
| Remote Command | :CALCulate:WAVeform:MARKer[1 2 ... 12:Y? |
| Example | CALC:WAV:MARK11:Y? |
| Notes | <p>When the marker is on, IQ waveform returns I and Q values.</p> <p>Case #1 - Trace RF, I or Q: returns a single double value. >:CALC:WAV:MARK1:Y? -2.402406506109E+001</p> <p>Case #2 - Trace IQ: returns a double array of two values, the first is I, and the second is Q. >:CALC:WAV:MARK1:Y? -3.006944493834E-003,+9.9870666467354E-004</p> <p>The IQ selection is for backward compatibility purposes. It is recommended that the users use the I and/or Q selection instead.</p> <p>You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode.</p> |
| Preset | Result dependent on the marker setup and signal source. |
| State Saved | No |
| Backwards Compatibility SCPI | :CALCulate:WAVeform:MARKer[1 2 ... 12:FUNction:RESult? |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Marker ->

There is no 'Marker ->' functionality supported in Waveform measurements. The front-panel key displays a blank menu when pressed.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Marker Function

Accesses a menu of marker functions that perform post-processing operations on markers based on the measurement specifications. Marker functions are distinct from measurement functions, which automatically perform complex sequences of setup, data acquisition, and display operations in order to measure specified signal characteristics. Marker Functions are specified for each individual marker and may be turned on individually for each marker.

The Marker Function menu controls which marker functions are turned on and allows you to adjust the setup parameters for each function. These parameters include the following, but only one parameter can be assigned to a given marker:

- Marker Noise
- BandInterval Power
- Band/Interval Density
- Marker Function Off

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Select Marker

Displays 12 markers available for selection.

| Key Path | Marker |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off

| Key Path | Marker Function |
|----------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:FUNction BPOWER BDENSITY OFF :CALCulate:WAVEform:MARKer[1] 2 ... 12:FUNction? |
| Example | CALC:WAV:MARK:FUNC BPOW CALC:WAV:MARK:FUNC? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | OFF |

| | |
|--------------------------|---|
| State Saved | Saved in instrument state. |
| Range | Band/Interval Power Band Interval Density Marker Function Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

| Key Path | Marker Function |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Band/Interval Span for Time Domain

Sets the width of the frequency span for the selected marker.

| Key Path | Marker Function |
|-------------------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVDO, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:FUNCTION:BAND:SPAN <time> :CALCulate:WAVEform:MARKer[1] 2 ... 12:FUNCTION:BAND:SPAN? |
| Example | CALC:WAV:MARK:FUNC:BAND:SPAN 20 ms CALC:WAV:MARK:FUNC:BAND:SPAN? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRUMENT:SElect to set the mode. |
| Couplings | Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values |
| Preset | 0 |
| Preset | 10% of Meas Time |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100 s |
| Backwards Compatibility SCPI | :CALCulate:WAVEform:MARKer[1] 2 ... 4:X:SPAN |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Band/Interval Left for Time Domain

Sets the left edge frequency or time value for the band of the selected marker.

| Key Path | Marker Function |
|--------------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer[1] 2 ... 12:FUNcTion:BAND:LEFT <time> :CALCulate:WAVeform:MARKer[1] 2 ... 12:FUNcTion:BAND:LEFT? |
| Example | CALC:WAV:MARK12:FUNC:BAND:LEFT 1 s CALC:WAV:MARK12:FUNC:BAND:LEFT? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values |
| Preset | 0 |
| Preset | 5% of Meas Time |
| State Saved | Saved in instrument state. |
| Min | 0 |
| Max | 100 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Band/Interval Right for Time Domain

Sets the right edge frequency or time value for the band of the selected marker.

| Key Path | Marker Function |
|-----------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN,,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVeform:MARKer[1] 2 ... 12:FUNcTion:BAND:RIGHT <time> :CALCulate:WAVeform:MARKer[1] 2 ... 12:FUNcTion:BAND:RIGHT? |
| Example | CALC:WAV:MARK12:FUNC:BAND:RIGH 1 s CALC:WAV:MARK12:FUNC:BAND:RIGH? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values |
| Preset | 0 |
| Preset | 5% of Meas Time |
| State Saved | Saved in instrument state. |

| | |
|--------------------------|------------------|
| Min | 0 |
| Max | 100 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

NOTE

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Remote Measurement Functions

This section contains the following topics:

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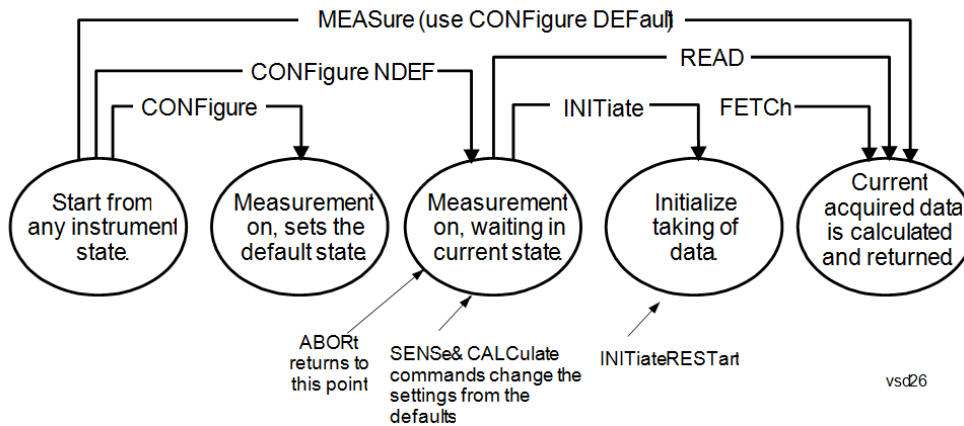
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Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
 - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
 - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
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READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
 - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
 - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
 - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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| Remote Command | :CONFigure? |
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| Example | CONF? |
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Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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| Remote Command | :CALCulate:CLIMits:FAIL? |
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| Example | CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails. |
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Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

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| Remote Command | :CALCulate:DATA[n]? |
| Notes | The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement. |
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Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

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| Remote Command | :CALCulate:DATA<n>:COMPRESS? BLOCK CFIT MAXimum MINimum MEAN DMEan RMS RMSCubed SAMPLE SDEVIation PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]] |
| Example | To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.) |
| Notes | The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data. |
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- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

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NOTE

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where $|X_i|$ is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left(\frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

NOTE For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where X_i is a data point value, and n is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where X_i is a data point value, \bar{X} is the arithmetic mean of the data point values for the specified region (s), and n is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where $|X_i|$ is the magnitude of an I/Q pair, \bar{X} is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where X_i is the complex value representation of an I/Q pair, X_i^* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

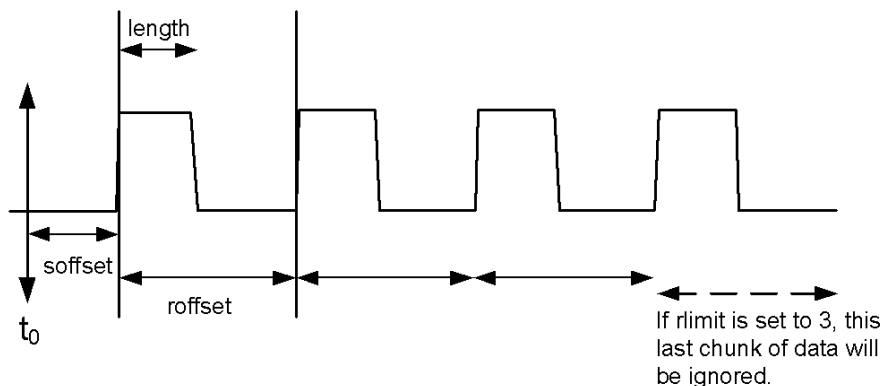
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where Y_i is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

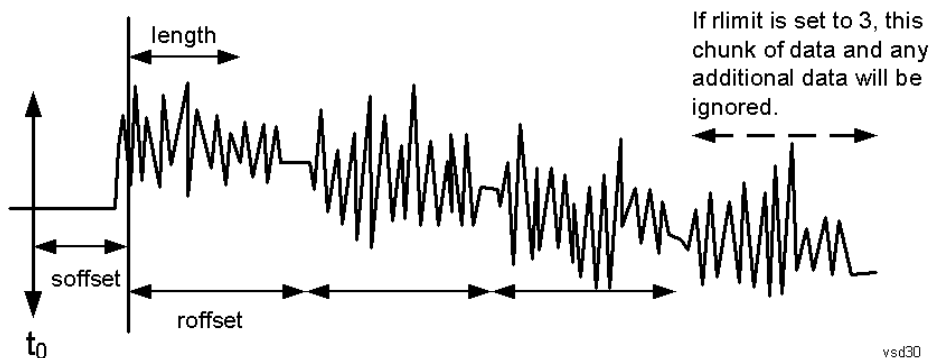
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

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| Remote Command | <p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME[,ALL GTDLline LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? <threshold>,<excursion>[,AMPLitude FREQuency TIME]</pre> |
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| Example | <p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p> |
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| Notes | <p><n> - is the trace that will be used</p> <p><threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p><excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p> |
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported
Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

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| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet |
| Example | :CALC:FPOW:POW1:RES |

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| Notes | Option FP2 is required. |
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Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

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| Mode | All |
| Remote Command | :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string" |
| Example | :CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005" |
| Notes | See below for a list of measurement variables that can be defined in the configuration string. |
| Initial S/W Revision | A.14.00 |

Acquisition Time

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| Example | CALC:FPOW:POW1:DEF "AcquisitionTime=0.002" |
| Notes | The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability. |
| Preset | 0.001 s |
| Range | 0 s to 1 s |
| Default Unit | Time (s) |
| Initial S/W Revision | A.14.00 |

Center Frequency

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| Example | CALC:FPOW:POW1:DEF "CenterFrequency=2e9" |
| Notes | The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency. |
| Preset | 1 GHz |
| Range | 0 Hz to maximum instrument frequency |
| Default Unit | Frequency (Hz) |
| Initial S/W Revision | A.14.00 |

DC Coupled

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| Example | CALC:FPOW:POW1:DEF "DCCoupled=True" |
| Notes | The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz. |
| Preset | False |
| Range | True (DC Coupled) or False (AC Coupled) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

DetectorType

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| Example | CALC:FPOW:POW1:DEF "DetectorType=Peak" |
| Notes | Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement. |
| Preset | RmsAverage |
| Range | RmsAverage, Peak |
| Initial S/W Revision | A.14.00 |

Do Noise Correction

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| Example | CALC:FPOW:POW1:DEF "DoNoiseCorrection=True" |
| Notes | When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured. |
| Preset | False |
| Range | True (enable noise correction) or False (disable noise correction) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Do Spur Suppression

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|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "DoSpurSuppression=True" |
| Notes | <p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p> |
| Preset | False |
| Range | True (enable spur suppression) or False (disable spur suppression) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuator Bypass

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "ElecAttBypass =False" |
| Notes | The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp. |
| Preset | True |
| Range | True (bypass electronic attenuator) or False (use electronic attenuator) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Electronic Attenuation

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "ElecAttenuation=10" |
| Notes | <p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p> |
| Preset | 0 dB |
| Range | 0 - 24 dB (1 dB steps) |

| | |
|-------------------------|---------|
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Gain

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "IFGain=10" |
| Notes | The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB. |
| Preset | 0 dB |
| Range | -6 - 16 dB (1 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

IF Type

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IFType=B25M" |
| Notes | The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path. |
| Preset | B40M |
| Range | B10M, B25M, B40M |
| Initial S/W Revision | A.14.00 |

Include Power Spectrum

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True" |
| Notes | The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response. |
| Preset | False |
| Range | True (return both channel power and full power spectrum) or False (returns only channel power) |
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Mechanical Attenuation

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "MechAttenuation=10" |
| Notes | The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps). |
| Preset | 0 dB |
| Range | 0 – 70 dB (2 dB steps) |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Preamp Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps. |
| Preset | Off |
| Range | Off, Low, Full |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth Mode

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "PreAmpMode=Low" |
| Notes | The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value. |
| Preset | BestSpeed |
| Range | BestSpeed, Narrowest, Explicit |
| Initial S/W Revision | A.14.00 |

Resolution Bandwidth

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "ResolutionBW=25e3" |
| Notes | The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW. |

| | |
|----------------------|---------|
| Preset | 0 Hz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Trigger Delay

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerDelay=0.025" |
| Notes | The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed. |
| Preset | 0 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Trigger Level

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerLevel=2" |
| Notes | The trigger level parameter sets the voltage value at which an external trigger is detected. |
| Preset | 1.2 V |
| Range | -5 to 5 V |
| Default Unit | Volts |
| Initial S/W Revision | A.14.00 |

Trigger Slope

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerSlope=Negative" |
| Notes | The trigger slope parameter indicates the direction of the edge trigger voltage for detection. |
| Preset | Positive |
| Range | Positive, Negative |
| Initial S/W Revision | A.14.00 |

Trigger Source

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "TriggerSource=Ext1" |
| Notes | The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively. |
| Preset | Free |
| Range | Free, Ext1, Ext2 |
| Initial S/W Revision | A.14.00 |

Trigger Timeout

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "TriggerTimeout=0.1" |
| Notes | The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement. |
| Preset | 1 s |
| Range | 0 - 1 s |
| Default Unit | Seconds |
| Initial S/W Revision | A.14.00 |

Signal Input

| | |
|-------------------------|--|
| Example | CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW" |
| Notes | The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz. |
| Preset | FpMainRf |
| Range | FpMainRf, Fp50MHzCW |
| Initial S/W Revision | A.14.00 |

Use Preselector

| | |
|---------|--|
| Example | CALC:FPOW:POW1:DEF "UsePreSelector=True" |
| Notes | The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases. |
| Preset | False |
| Range | True (use preselector above 3.6 GHz), or False (preselector bypassed) |

| | |
|----------------------|---------|
| Default Unit | Boolean |
| Initial S/W Revision | A.14.00 |

Channel Bandwidth Array

| | |
|----------------------|---|
| Example | CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]" |
| Notes | The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [1e6] |
| Range | 0 to 40 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Filter Type Array

| | |
|----------------------|--|
| Example | CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]" |
| Notes | The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter. |
| Preset | [IBW] |
| Range | IBW, RRC |
| Initial S/W Revision | A.14.00 |

Channel Filter Alpha Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]" |
| Notes | The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter. |
| Preset | [0.22] |
| Range | 0.0 - 1.0 |

| | |
|-------------------------|---------|
| Initial S/W Revision | A.14.00 |
|-------------------------|---------|

Channel Measurement Function Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]" |
| Notes | <p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p> |
| Preset | [BandPower] |
| Range | BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth |
| Initial S/W Revision | A.14.00 |

Channel Offset Frequency Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]" |
| Notes | <p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p> |
| Preset | [0] |
| Range | 0 to 20 MHz |
| Default Unit | Hz |
| Initial S/W Revision | A.14.00 |

Channel Occupied Bandwidth Percent Array

| | |
|---------|---|
| Example | CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]" |
| Notes | This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied |

| | |
|-------------------------|--|
| | bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power. |
| Preset | [0.99] |
| Range | 0 - 1.0 |
| Initial S/W Revision | A.14.00 |

Channel x-dB Bandwidth Array

| | |
|-------------------------|---|
| Example | CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]" |
| Notes | This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number. |
| Preset | [-3.01] |
| Range | -200 to 0 dB |
| Default Unit | dB |
| Initial S/W Revision | A.14.00 |

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

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R :CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?
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-----
E :CALC:FPOW:POW1:DEF?

```

x
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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWer[1,2,...,999]:CONFigure |
| Example | :CALC:FPOW:POW1:CONF |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:INITiate |
| Example | :CALC:FPOW:POW1:INIT |
| Notes | Option FP2 is required. |
| Initial S/W Revision | A.14.00 |

Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:FETCh? |
| Example | :CALC:FPOW:POW1:FETC? |
| Notes | Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel. |
| Initial S/W Revision | A.14.00 |

Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

| | |
|-----------------------|---------------------------------------|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]? |
| Example | :CALC:FPOW:POW1? |

| | |
|----------------------|--|
| Notes | Option FP2 is required. See notes for Fast Power Fetch for return format. |
| Initial S/W Revision | A.14.00 |

Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

| | |
|-----------------------|--|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1? |
| Example | :CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1? |
| Notes | Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined. |
| Initial S/W Revision | A.14.00 |

Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

| | |
|-----------------------|---|
| Mode | All |
| Remote Command | :CALCulate:FPOWER:POWER[1,2,...,999]:READ2? |
| Example | :CALC:FPOW:POW1:READ2? |
| Notes | Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] |

| | |
|--|---|
| | 3. Declared function result for the 2nd specified channel [4 byte float] |
| | ... |
| | (m + 1). Declared function result for the last (mth) specified channel [4 byte float] |
| | ADC Over Range |
| | 1. ADC over-range occurred (1: true, 0: false) [2 byte short] |
| | Spectrum Data |
| | 1. Number of points in the spectrum data, k [4 byte int] |
| | 2. Start frequency of spectrum data (Hz) [8 byte double] |
| | 3. Step frequency of spectrum data (Hz) [8 byte double] |
| | 4. FFT bin at 1st point (dBm) [4 byte float] |
| | 5. FFT bin at 2nd point (dBm) [4 byte float] |
| | ... |
| | (k + 3). FFT bin at last (kth) point (dBm) [4 byte float] |

| | |
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| Initial S/W | A.14.00 |
| Revision | |

Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer [n]? commands and queries.

| | |
|--------------------------------|---|
| Remote Command | :FORMat [:TRACe] [:DATA] ASCii INTeger, 32 REAL, 32 REAL, 64 :FORMat [:TRACe] [:DATA] ? |
| Notes | The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block. |
| Dependencies | Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number". |
| Preset | ASCii |
| Backwards Compatibility | Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves |

| | |
|----------------------|--|
| Notes | backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. |
| Initial S/W Revision | Prior to A.02.00 |

The specs for each output type follow:

ASCIi - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

| | |
|-----------------------|--|
| Remote Command | :FORMat:BORDER NORMal SWAPped :FORMat:BORDER? |
| Preset | NORMal |
| Initial S/W Revision | Prior to A.02.00 |

Meas Setup

Displays the setup menu keys that enable you to control the parameters for the current measurement.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Average/Hold Num

Sets the number of sweeps (average counts) that are averaged. After the specified number of sweeps, the averaging mode (terminal control) setting determines the averaging action.

| Key Path | Meas Setup |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | [:SENSe] :WAVeform:AVErAge:COUNt <integer> [:SENSe] :WAVeform:AVErAge:COUNt? [:SENSe] :WAVeform:AVErAge [:STATe] OFF ON 0 1 [:SENSe] :WAVeform:AVErAge [:STATe] ? |
| Example | WAV:AVER:COUN 1001 WAV:AVER:COUN? WAV:AVER ON WAV:AVER? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 10 OFF |
| State Saved | Saved in instrument state. |
| Min | 1 |
| Max | 20001 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Avg Mode

Enables you to set the averaging mode.

- When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.
- When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

| Key Path | Meas Setup |
|--------------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | [:SENSe]:WAVeform:AVERAge:TCONtrol EXPonential REPeat [:SENSe]:WAVeform:AVERAge:TCONtrol? |
| Example | WAV:AVER:TCON REP WAV:AVER:TCON? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | EXPonential |
| State Saved | Saved in instrument state. |
| Range | Exp Repeat |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Avg Type

Selects the type of averaging.

| Key Path | Meas Setup |
|--------------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | [:SENSe]:WAVeform:AVERAge:TYPE LOG RMS SCALar [:SENSe]:WAVeform:AVERAge:TYPE? |
| Example | WAV:AVER:TYPE RMS WAV:AVER:TYPE? |
| Preset | RMS |
| State Saved | Saved in instrument state. |
| Range | Pwr Avg(RMS) Log-Pwr Avg(Video) Voltage Avg |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Avg Type Auto

When **Auto** is selected, the analyzer chooses the type of averaging. When one of the average types is selected manually, the analyzer uses that type regardless of other analyzer settings, and shows Man on the **Average Type** softkey.

| | |
|---------------------------------|---|
| Key Path | Meas Setup, Avg Type |
| Remote Command | [:SENSe] :WAVeform:AVERage:TYPE:AUTO [:STATe] ON OFF 1 0 [:SENSe] :WAVeform:AVERage:TYPE:AUTO [:STATe] ? |
| Example | WAV:AVER:TYPE:AUTO 0 WAV:AVER:TYPE:AUTO? |
| Couplings | Auto selects Power (RMS) averaging if a Marker Function (Marker Noise, Band/Intvl Power) is on. |
| Preset | ON |
| State Saved | Saved in instrument state. |
| Range | Auto Man |
| Modified at S/W Revision | A.14.00 |

Meas Time

Sets how long the measurement is performed. X Scale only changes the representation of the display.

| | |
|---------------------------------|--|
| Key Path | Meas Setup |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | [:SENSe] :WAVeform:SWEep:TIME <time> [:SENSe] :WAVeform:SWEep:TIME? |
| Example | WAV:SWE:TIME 50 ms WAV:SWE:TIME? |
| Notes | Specifies and returns how long the measurement is performed. It is the time record length of the measurement waveform. The Max time may be reduced when the sample frequency is high due to the memory limitation. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | All except the following list: 2.000000 ms LTEAFDD, LTEATDD: 10 ms LTETDD: 10 ms LTE: 10 ms |
| State Saved | Saved in instrument state. |
| Range | 1.000 (s to 100.00 s) |
| Min | 1.000 us |
| Max | 3200 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Sample Rate

Enables you to set an arbitrary sample rate for the acquired data to be processed.

| Key Path | Meas Setup |
|--------------------------|---|
| Mode | BASIC |
| Remote Command | <code>[:SENSe] :WAVeform:SRATe <freq></code> <code>[:SENSe] :WAVeform:SRATe?</code> |
| Example | WAV:SRAT 1.3636 MHz |
| Notes | Command and query available when Option DP2, B40, or wider IF Bandwidth option is installed. For other configuration, only query is available. |
| Couplings | The coupling between Sample Rate and IF BW depends on Physics implementation. |
| Preset | 125.0 kHz |
| Min | 12.5 Hz |
| Max | <ul style="list-style-type: none"> • (For Option DP2, B40 or wider IF Bandwidth option) • Digital IF 10 MHz path: 12.5 MHz • Digital IF 25 MHz path: 31.25 MHz • Digital IF 40 MHz path: 50 MHz • Option B85 85 MHz path: 106.25 MHz • Option B1A 125 MHz path: 156.25 MHz • Option B1X 140 MHz path: 175 MHz • Option B1Y 160 MHz path: 200 MHz • Option B2X 140 MHz path: 300 MHz • Option B5X 160 MHz path: 300 MHz • (For all other configuration) • 10 MHz path: 15 MHz • Option B25 25 MHz path: 45 MHz |
| Modified at S/W Revision | 13.00 |

Meas Preset

Restores all the measurement parameters to their default values.

| Key Path | Meas Setup |
|-----------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTEATDD, DCATV, WLAN, MSR, LTEATDD, LTEAFDD |
| Remote Command | <code>:CONFigure:WAVeform</code> |
| Example | CONF:WAV |
| Notes | Restore default values of all parameters. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Sample Period (Aperture) Setting (Remote Command Only)

Returns the time between samples (sample period or aperture).

| | |
|-----------------------|--|
| Mode | BASIC |
| Remote Command | [:SENSE] :WAVEform:APERture? |
| Example | WAV:APER? |
| Notes | Query only. |
| Couplings | Coupled to Sample Rate by the following equation. Sample Period = 1/(Sample Rate) |
| Preset | 1/(Sample Rate Default) |
| Min | 1/(Max Sample Rate) |
| Max | 1/(Min Sample Rate) |

Mode

See "Mode" on page 204

Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 2463 for more information.

| Key Path | Front-panel key |
|--------------------------------------|---|
| Remote Command | :SYSTem:PRESet |
| Example | :SYST:PRES |
| Notes | *RST is preferred over :SYST : PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0. |
| Couplings | A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set. |
| Backwards Compatibility Notes | In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using |

| | |
|----------------------|------------------|
| | User Preset. |
| Initial S/W Revision | Prior to A.02.00 |

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

| Type Of Preset | SCPI Command | Front Panel Access |
|--------------------------------|--|--|
| Auto Couple | :COUPlE ALL | Auto Couple front-panel key |
| Meas Preset | :CONFIgure:<Measurement> | Meas Setup Menu |
| Mode Preset | :SYSTem:PRESet | Mode Preset (green key) |
| Restore Mode Defaults | :INSTRument:DEFault | Mode Setup Menu |
| Restore All Mode Defaults | :SYSTem:DEFault MODEs | System Menu; Restore System Default Menu |
| *RST | *RST | not possible (Mode Preset with Single) |
| Restore Input/Output Defaults | :SYSTem:DEFault INPut | System Menu; Restore System Default Menu |
| Restore Power On Defaults | :SYSTem:DEFault PON | System Menu; Restore System Default Menu |
| Restore Alignment Defaults | :SYSTem:DEFault ALIGn | System Menu; Restore System Default Menu |
| Restore Miscellaneous Defaults | :SYSTem:DEFault MISC | System Menu; Restore System Default Menu |
| Restore All System Defaults | :SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent | System Menu; Restore System Default Menu |
| User Preset | :SYSTem:PRESet:USER | User Preset Menu |
| User Preset All Modes | :SYSTem:PRESet:USER:ALL | User Preset Menu |

15 Waveform Measurement
Mode Preset

| | | |
|----------------------|-----------------------|-------------|
| Power On Mode Preset | :SYSTem:PON:TYPE MODE | System Menu |
| Power On User Preset | :SYSTem:PON:TYPE USER | System Menu |
| Power On Last State | :SYSTem:PON:TYPE LAST | System Menu |

Mode Setup

See ["Mode Setup"](#) on page 221

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace and accesses a menu that enables you to select to do a next peak or minimum peak search.

| Key Path | Front-panel key |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CM MB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:MAXimum |
| Example | CALC:WAV:MARK2:MAX |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Next Peak

Moves the selected marker to the next highest local maximum with a value less than that of the current marker.

| Key Path | Peak Search |
|--------------------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CM MB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:MAXimum:NEXT |
| Example | CALC:WAV:MARK:MAX:NEXT |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

| Key Path | Peak Search |
|----------------|--|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CM MB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :CALCulate:WAVEform:MARKer[1] 2 ... 12:MINimum |
| Example | CALC:WAV:MARK:MIN |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |

| | |
|--------------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

15 Waveform Measurement
Print

Print

See ["Print " on page 277](#)

Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

| Type | Default Prefix | Menu |
|-----------------------|----------------|-----------------|
| State | State_ | (Save/Recall) |
| Trace + State | State_ | (Save/Recall) |
| Screen | Screen_ | (Save/Recall) |
| Amplitude Corrections | Ampcor_ | (Import/Export) |
| Traces | Trace_ | (Import/Export) |
| Limit Lines | LLine_ | (Import/Export) |
| Measurement Result | MeasR_ | (Import/Export) |
| Capture Buffer | CapBuf_ | (Import/Export) |

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, it advances the counter to State_0011.state to ensure that no conflict will exist (and then it verifies that State_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred_0000.csv.

NOTE

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

NOTE

If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

| | |
|----------------------|--|
| Key Path | Front-panel key |
| Notes | No remote command for this key specifically. |
| Initial S/W Revision | Prior to A.02.00 |

Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

| Key Path | Front-panel key |
|-------------------------------|--|
| Notes | <p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe <filename>.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p> |
| Backwards Compatibility Notes | <p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> |
| Backwards Compatibility Notes | <p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p> |
| Initial S/W Revision | Prior to A.02.00 |

State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the

additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See "[More Information](#)" on page 2473.

| Key Path | Recall |
|----------------|--|
| Mode | All |
| Remote Command | :MMEMory:LOAD:STATe <filename> |
| Example | :MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path |
| Example | MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state. |
| Notes | <p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> • If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number. <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> • Makes the saved measurement for the mode the active measurement. • Clears the input and output buffers. • Status Byte is set to 0. • Executes a *CLS <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If</p> |

| | |
|-------------------------------------|---|
| | there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away. After the Recall, the analyzer exits the Recall menu and returns to the previous menu. |
| Backwards Compatibility SCPI | :MMEMory:LOAD:STATe 1,<filename> For backwards compatibility, the above syntax is supported. The "1" is simply ignored. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

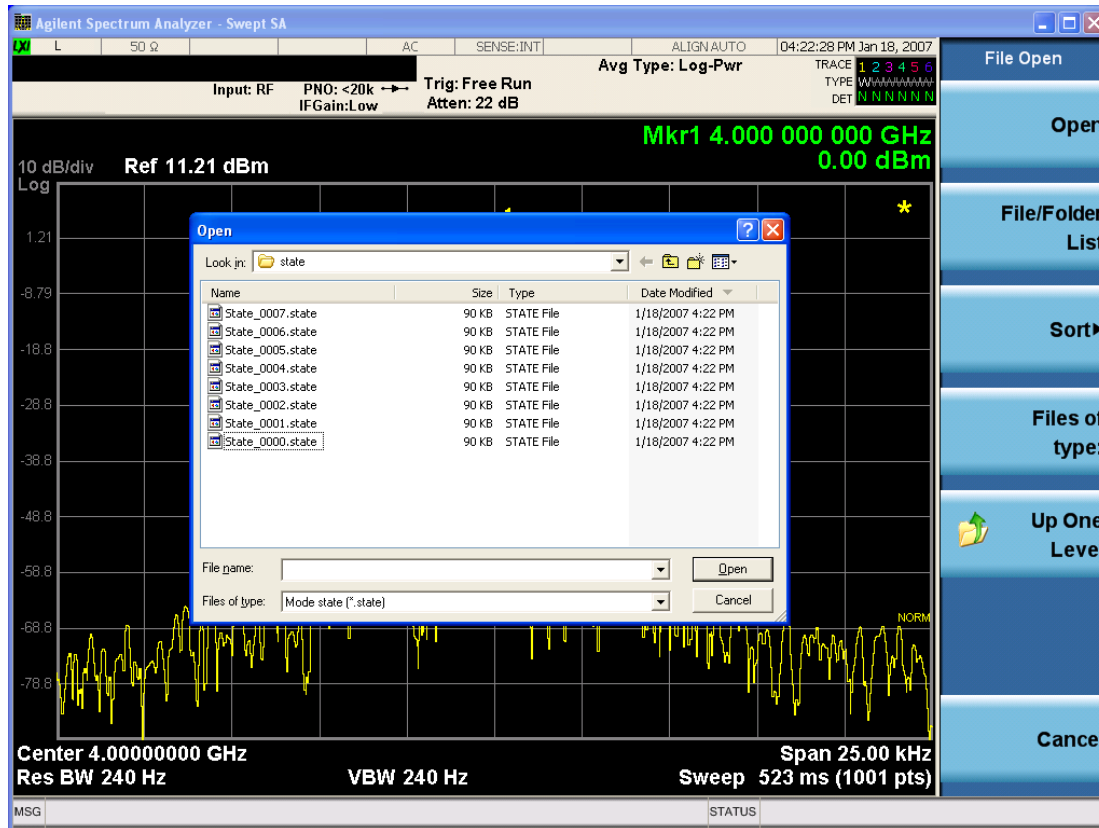
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

| | | |
|---|--|--|
| You want to recall state and one trace's data, leaving other traces unaffected. | Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed. | On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed. |
| You want to recall all traces | Save Trace+State from ALL traces. | On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved) |
| You want all traces to load exactly as they were when saved. | Save State | On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten. |

From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

| Key Path | Recall, State |
|----------------------|---|
| Notes | Brings up the Open dialog for recalling a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

| Key Path | Recall, State |
|----------------------|---|
| Mode | All |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available" |
| Initial S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|---------------------------------|---|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

| | |
|--------------------------|--|
| Key Path | Recall, State |
| Example | *RCL 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | Prior to A.11.00 |

Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

| | |
|-----------------------|--|
| Key Path | Recall, Sequences |
| Mode | All |
| Remote Command | :MMEMory:LOAD:SEQuences: SLIS ALIS SAALIS "MySequence.txt" |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Notes | Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt) |
| Initial S/W Revision | A.05.00 |

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|----------------------|--------------------------------------|
| Key Path | Recall, Sequences |
| Example | :MMEM:LOAD:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall occurs as soon as the Open button is pressed.

| | |
|----------------------|--|
| Key Path | Recall |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands. |
| Dependencies | If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Masks

This key enables you to recall a preset mask file from the list. It is only available in SEM measurement under the Data menu: Limit Mask. Limit Mask enables setting a preset limit mask for 802.11p 5MHz and 10MHz system.

You cannot change or create the preset mask file since it is a binary file. This key is valid for the Spectrum Emission Mask measurement.

File location: "My Documents\WLAN\data.masks"

Note that "**My Documents**" is an alias to a directory and its location depends on which user is logged in. At XSA start up, all of the limit mask files in the current user's "My Documents\WLAN\data.masks" directory are overwritten.

File type: Binary

Filename:

11p_5MHz_A.mask

11p_5MHz_B.mask

11p_5MHz_C.mask

11p_5MHz_D.mask

11p_10MHz_A.mask

11p_10MHz_B.mask

11p_10MHz_C.mask

11p_10MHz_D.mask

File extension: .mask

Selecting OPEN under the Import Data menu, opens the above directory enabling you to select a mask file.

Example:

File Location: My Documents/WLAN/data/masks

File Name: 11p_5MHz_A.mask

| | |
|--------------------------|----------------------------------|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Remote Command | MMEMory:LOAD:MASK <string> |
| Example | MMEM:LOAD:MASK "11p_5MHz_A.mask" |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45559 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|------------------------------|---|
| parameter_table_ 23.52557 | 52.93253 |
| Key Path | Recall, Data |
| Mode | WLAN |
| Example | MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other situation, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45560 |

Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 2473 in **Recall, State**, for a full description of this dialog and menu.

| | |
|----------------------|--|
| Key Path | Recall, Data |
| Notes | The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 2481

| Key Path | Front-panel key |
|-------------------------------|--|
| Remote Command | :INITiate[:IMMEDIATE] :INITiate:RESTART |
| Example | :INIT:IMM :INIT:REST |
| Notes | :INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function. |
| Couplings | Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement. |
| Status Bits/OPC dependencies | This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set. |
| Backwards Compatibility Notes | For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write , but did not restart Max Hold and Min Hold . In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average , but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation. |
| Initial S/W Revision | Prior to A.02.00 |

More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

| | |
|----------------------|---|
| Key Path | Front-panel key |
| Mode | All |
| Notes | No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>. |
| Initial S/W Revision | Prior to A.02.00 |

State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<>mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

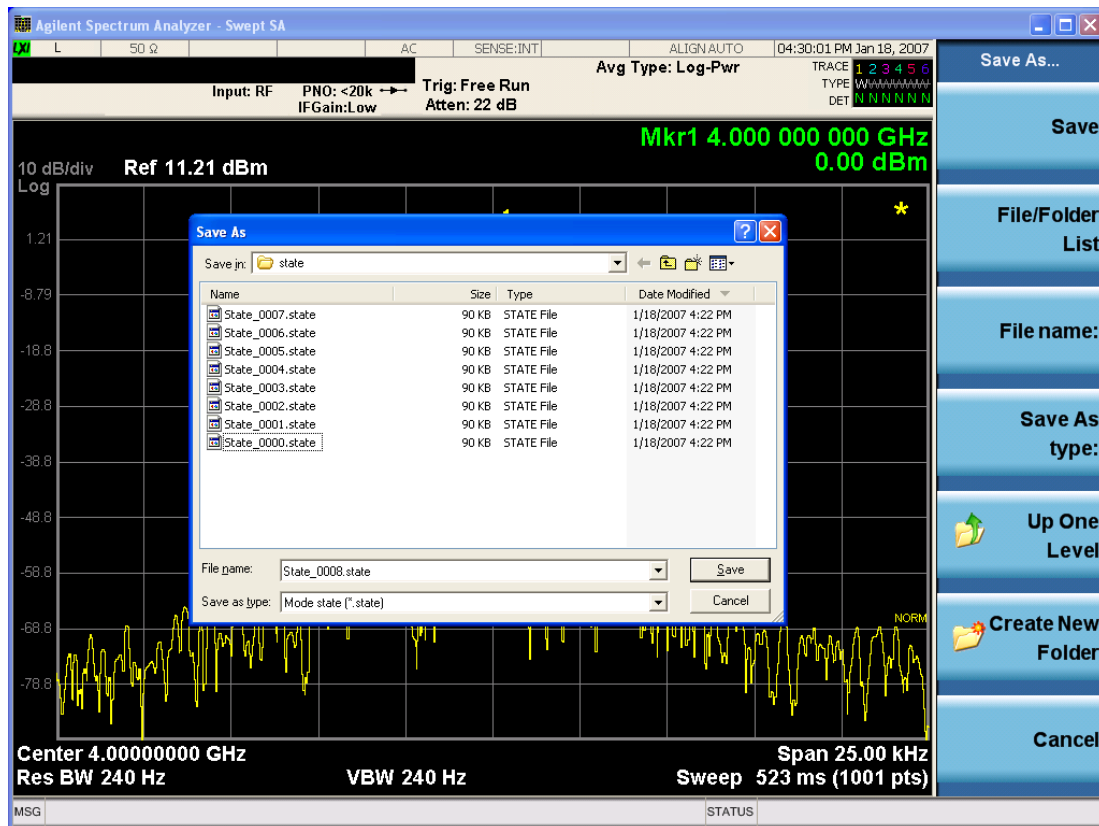
| | |
|----------------|---|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:STATe <filename> |
| Example | MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory. |
| Notes | Both single and double quotes are supported for any filename parameter over remote. After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key. After saving to a register, you remain in the Save State menu, so that you can see the Register key |

update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

| | |
|-------------------------------------|-----------------------------------|
| Backwards Compatibility SCPI | :MMEMory:STORe:STATe 1,<filename> |
| Initial S/W Revision | Prior to A.02.00 |

To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 2469](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

| | |
|----------------------|---|
| Key Path | Save, State |
| Mode | All |
| Notes | Brings up Save As dialog for saving a State Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 2486](#)

| | |
|-----------------------|--|
| Key Path | Save, State |
| Mode | All |
| Remote Command | :MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number> |
| Example | :MMEM:REG:STAT:LAB 1,"my label" |
| Notes | <reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,"" |
| Dependencies | N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available" |
| Preset | The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc" |
| Initial S/W Revision | A.11.00 |

More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The *SAV and *RCL commands will not be affected by the custom register names, nor will the MMEM commands.

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|--------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1–16 from front panel, 1–128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the *SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

| | |
|---------------------------------|--|
| Key Path | Save, State |
| Mode | All |
| Example | *SAV 1 |
| Range | 1-16 from front panel, 1-128 from SCPI |
| Readback | Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register. |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.11.00 |

Mass Storage Catalog (Remote Command Only)

| | |
|-----------------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CATalog? [<directory_name>] |
| Notes | The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Change Directory (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory? |

| | |
|----------------------|---|
| Notes | <p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p> |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Copy (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy <string>,<string>[,<string>,<string>] |
| Notes | <p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p> |

Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

| | |
|-----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:COpy:DEvice <source_string>,<dest_string> |
| Notes | <p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p> |

Mass Storage Delete (Remote Command Only)

| | |
|-----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DElete <file_name>[,<directory_name>] |

| | |
|----------------------|---|
| Notes | The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

| | |
|----------------------|--|
| Key path | SCPI Only |
| Remote Command | :MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name> |
| Notes | The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Make Directory (Remote Command Only)

| | |
|----------------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MDIRectory <directory_name> |
| Notes | The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges. |
| Initial S/W Revision | Prior to A.02.00 |

Mass Storage Move (Remote Command Only)

| | |
|----------------|---|
| Key path | SCPI Only |
| Remote Command | :MMEMory:MOVE <string>,<string>[,<string>,<string>] |
| Notes | The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. |

The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Mass Storage Remove Directory (Remote Command Only)

| | |
|----------|------------------|
| Key path | SCPI Only |
|----------|------------------|

| | |
|-----------------------|--------------------------------------|
| Remote Command | :MMEMory:RDIRectory <directory_name> |
|-----------------------|--------------------------------------|

| | |
|-------|--|
| Notes | <p>The string must be a valid logical path.</p> <p>Removes a directory. The <directory_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p> |
|-------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

| | |
|----------|------------------------|
| Key Path | Save, Sequences |
|----------|------------------------|

| | |
|------|-----|
| Mode | All |
|------|-----|

| | |
|-----------------------|---|
| Remote Command | :MMEM:STOR:SEquences: SLISt ALISt SAALISt SSTep "MySequence.txt" |
|-----------------------|---|

| | |
|----------------|---------------------------------------|
| Example | :MMEM:STOR:SEQ:SLISt "MySequence.txt" |
|----------------|---------------------------------------|

| | |
|-------|--|
| Notes | <p>Available file types are:</p> <ul style="list-style-type: none"> -CSV (Comma delimited) (*.csv) -Text (Tab delimited) (*.txt) |
|-------|--|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Save, Sequences |
| Example | :MMEM:STOR:SEQ:SLIS "MySequence.txt" |
| Dependencies | Only available in XOBT |
| Initial S/W Revision | A.05.00 |

Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

| | |
|-----------------------------|--|
| Key Path | Save, Sequences |
| Mode | All |
| Notes | Brings up Save As dialog for saving a Sequence Save Type |
| Initial S/W Revision | A.05.00 |

Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

| | |
|-----------------|--|
| Key Path | Save |
| Mode | All |
| Notes | The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in |

| | |
|----------------------|---|
| | the MMEM:STOR commands. |
| Dependencies | If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it. |
| Preset | Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults |
| Readback | The data type that is currently selected |
| Initial S/W Revision | Prior to A.02.00 |

Meas Results

| | |
|--------------------------|---|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:RES "MyResultsFile.csv" This stores the measurement results data in the file MyResultsFile.xml in the default directory. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45561 |

Capture Buffer

Capture buffer functionality is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. The captured data is raw data which is not processed.

| | |
|--------------------------|--|
| parameter_table_23.52557 | 52.93253 |
| Key Path | Save, Data |
| Mode | WLAN |
| Example | MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory. |
| Dependencies | Capture buffer data is only available when measurement is Mod Accuracy and radio standard is not 802.11ac 80+80MHz. In other measurements, this key is grayed out. |
| Initial S/W Revision | A.11.00 |
| Help Map ID | 45562 |

Save As . . .

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

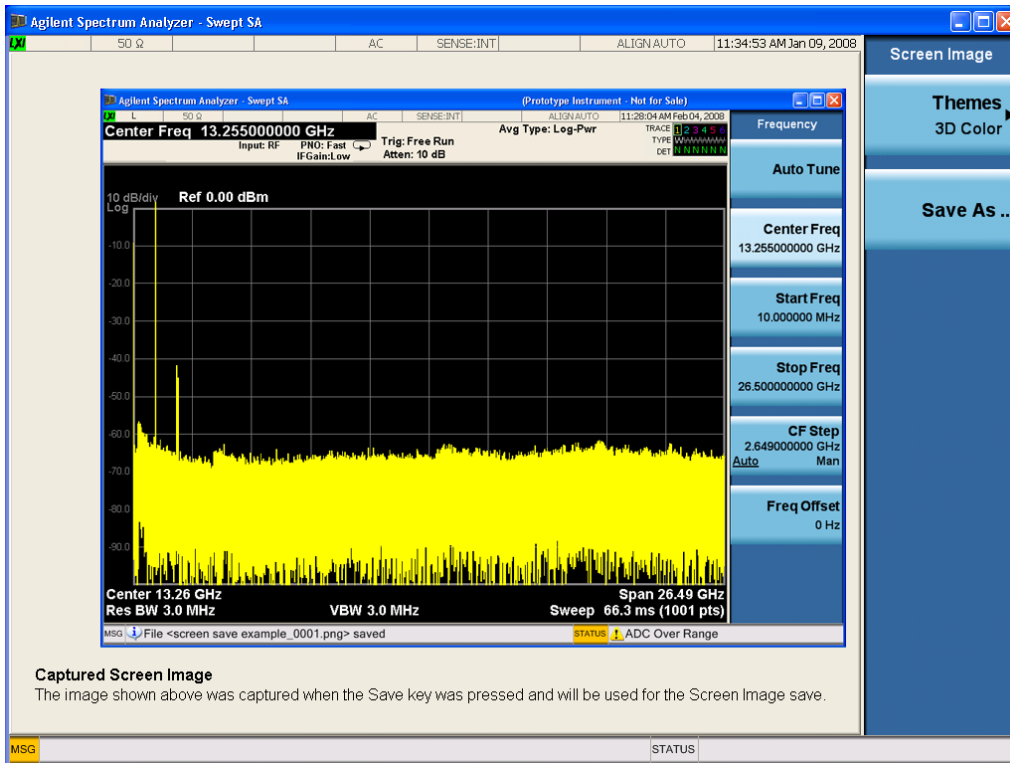
| Key Path | Save, Data |
|----------------------|--|
| Mode | All |
| Notes | The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete. |
| Initial S/W Revision | Prior to A.02.00 |

Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

| | |
|----------------------|--|
| Key Path | Save |
| Mode | All |
| Remote Command | :MMEMory:STORe:SCReem <filename> |
| Example | :MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|--------------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReem:THEMe TDColor TDMonochrome FCOLor FMONochrome :MMEMory:STORe:SCReem:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|-----------------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|-----------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
|-----------------|-----------------------------------|

| | |
|----------------------|-------------------------|
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 2484 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

| | |
|----------------------|--|
| Key Path | Save, Screen Image |
| Notes | Brings up Save As dialog for saving a Screen Image Save Type |
| Initial S/W Revision | Prior to A.02.00 |

Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

See "[More Information](#)" on page 2498

| | |
|-------------------------------|--|
| Key Path | Front-panel key |
| Example | :INIT:CONT OFF |
| Notes | See Cont key description. |
| Backwards Compatibility Notes | <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA & PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p> |
| Initial S/W Revision | Prior to A.02.00 |

More Information

See "[Restart](#)" on page 2481 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the **Single** key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the **Single** key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the **Single** key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

| Key Path | Front-panel key |
|----------|-----------------|
|----------|-----------------|

RF Output

This parameter sets the source RF power output state.

| Key Path | Source |
|-----------------------|---|
| Remote Command | :OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]? |
| Example | OUTP OFF OUTP? |
| Notes | <p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 2586 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p> |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Amplitude

Allows you to access the Amplitude sub-menu.

| Key Path | Source |
|----------------------|--|
| Notes | <p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585. If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 2586 to Off will make source leave list sequencer and this button will be black out.</p> |
| Initial S/W Revision | A.05.00 |

RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 2501](#) table below for the valid ranges.

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| Example | :SOUR:POW -100 dBm |
| Notes | <p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p> |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and "ARB" on page 2535 ARB State is On, this setting will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | -100 dBm |
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 2501 table below for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 2501 table below for the valid ranges. |

| | |
|--------------------------|---|
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

RF Power Range

| RF Output Port | Frequency Range | Min Output Power | Max Output Power |
|-------------------|--------------------|------------------|------------------|
| High Power RF Out | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 20 dBm |
| RFIO 1 & RFIO 2 | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |
| GPS (Note2) | 10 MHz ≤ f ≤ 6 GHz | -150 dBm | 0 dBm |

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

| Key Path | Source, Amplitude |
|----------------------|---|
| Dependencies | This key is unavailable, and is grayed out when the " List Sequencer " on page 2585 is turned ON. |
| Initial S/W Revision | A.05.00 |

Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 2501](#)

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer:REFerence <ampl> :SOURce:POWer:REFerence? :SOURce:POWer:REFerence:STATe OFF ON 0 1 :SOURce:POWer:REFerence:STATe? |
| Example | :SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON |
| Dependencies | This setting is unavailable and is grayed out when the "List Sequencer" on page 2585 is turned ON. |
| Couplings | This value is coupled to the "Set Reference Power " on page 2501 key such that pressing the Set Reference Power key updates the reference power with the current output power. |
| Preset | 0.00 dBm OFF |
| Min | -125.00 dBm |
| Max | 10.00 dBm |
| Initial S/W Revision | A.05.00 |

Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

| Key Path | Source, Amplitude |
|-----------------------|--|
| Remote Command | :SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet? |
| Example | :SOUR:POW:OFFS 0.00 dB |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0.00 dB |
| Min | -200.00 dB |
| Max | 200.00 dB |
| Initial S/W Revision | A.05.00 |

Modulation

Allows you to toggle the state of the modulation.

| Key Path | Source |
|-----------------------|--|
| Remote Command | :OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]? |
| Example | :OUTP:MOD OFF |
| Notes | This setting is for independent mode and has no effect on " List Sequencer " on page 2585. If the " Sequencer " on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " Sequencer " on page 2586 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to access the Frequency sub-menu.

| Key Path | Source |
|----------------------|--|
| Notes | The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2585 . If the "Sequencer" on page 2586 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When setto Off will make source leave list sequencer and this button will be black out. |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]? |
| Example | :SOUR:FREQ 1.00 GHz |
| Notes | Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency. |
| Couplings | The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 2505](#),

"W-CDMA Channel Number Ranges" on page 2506, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 2507, and "LTE FDD Channel Number Ranges" on page 2509.

| Key Path | Source, Frequency |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer? |
| Example | :SOUR:FREQ:CHAN:NUMB 1 |
| Notes | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Dependencies | This key is grayed out when the "Radio Standard" on page 2513 is set to NONE. This key is grayed out on E6630A. |
| Couplings | The channel number is coupled to the frequency value when the "Radio Standard" on page 2513 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | Please refer to the tables below for the valid ranges. |
| Max | Please refer to the tables below for the valid ranges. |
| Initial S/W Revision | A.05.00 |

GSM/EDGE Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|------------------------|---------------------------|
| P-GSM | Uplink (MS) | $1 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | Downlink (BS) | $1 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| E-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $975 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| DCS 1800 | Uplink (MS) | $512 \leq n \leq 885$ | $1710.200 + 0.20*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 885$ | $1805.200 + 0.20*(n-512)$ |
| PCS 1900 | Uplink (MS) | $512 \leq n \leq 810$ | $1850.200 + 0.2*(n-512)$ |
| | Downlink (BS) | $512 \leq n \leq 810$ | $1930.200 + 0.2*(n-512)$ |
| R-GSM | Uplink (MS) | $0 \leq n \leq 124$ | $890.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $890.0 + 0.2*(n-1024)$ |
| | Downlink (BS) | $0 \leq n \leq 124$ | $935.0 + 0.2*n$ |
| | | $955 \leq n \leq 1023$ | $935.0 + 0.2*(n-1024)$ |
| GSM 450 | Uplink (MS) | $256 \leq n \leq 293$ | $450.6 + 0.2*(n-259)$ |
| | Downlink (BS) | $256 \leq n \leq 293$ | $460.6 + 0.2*(n-259)$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|----------|---------------|-----------------------|--------------------------|
| GSM 480 | Uplink (MS) | $306 \leq n \leq 340$ | $479.000 + 0.20*(n-306)$ |
| | Downlink (BS) | $306 \leq n \leq 340$ | $489.000 + 0.20*(n-306)$ |
| GSM 850 | Uplink (MS) | $128 \leq n \leq 251$ | $824.200 + 0.20*(n-128)$ |
| | Downlink (BS) | $128 \leq n \leq 251$ | $869.200 + 0.20*(n-128)$ |
| GSM 700 | Uplink (MS) | $438 \leq n \leq 516$ | $777.200 + 0.20*(n-438)$ |
| | Downlink (BS) | $438 \leq n \leq 516$ | $747.200 + 0.20*(n-438)$ |
| T-GSM810 | Uplink (MS) | $350 \leq n \leq 425$ | $806.0 + 0.20*(n-350)$ |
| | Downlink (BS) | $350 \leq n \leq 425$ | $851.0 + 0.20*(n-350)$ |

W-CDMA Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|---------------------------|---------------------|
| Band I | Downlink | $10562 \leq n \leq 10838$ | $n \div 5$ |
| | Uplink | $9612 \leq n \leq 9888$ | $n \div 5$ |
| Band II | Downlink | $412 \leq n \leq 687$ | $n \div 5 + 1850.1$ |
| | | $9662 \leq n \leq 9938$ | $n \div 5$ |
| | Uplink | $12 \leq n \leq 287$ | $n \div 5 + 1850.1$ |
| | | $350 \leq n \leq 425$ | $n \div 5$ |
| Band III | Downlink | $1162 \leq n \leq 1513$ | $n \div 5 + 1575$ |
| | Uplink | $937 \leq n \leq 1288$ | $n \div 5 + 1525$ |
| Band IV | Downlink | $537 \leq n \leq 1738$ | $n \div 5 + 1805$ |
| | | $1887 \leq n \leq 2087$ | $n \div 5 + 1735.1$ |
| | Uplink | $1312 \leq n \leq 1513$ | $n \div 5 + 1450$ |
| | | $1662 \leq n \leq 1862$ | $n \div 5 + 1380.1$ |
| Band V | Downlink | $1007 \leq n \leq 1087$ | $n \div 5 + 670.1$ |
| | | $4357 \leq n \leq 4458$ | $n \div 5$ |
| | Uplink | $782 \leq n \leq 862$ | $n \div 5 + 670.1$ |
| | | $4132 \leq n \leq 4233$ | $n \div 5$ |
| Band VI | Downlink | $1037 \leq n \leq 1062$ | $n \div 5 + 670.1$ |
| | | $4387 \leq n \leq 4413$ | $n \div 5$ |
| | Uplink | $812 \leq n \leq 837$ | $n \div 5 + 670.1$ |
| | | $4162 \leq n \leq 4188$ | $n \div 5$ |
| Band VII | Downlink | $2237 \leq n \leq 2563$ | $n \div 5 + 2175$ |
| | | $2587 \leq n \leq 2912$ | $n \div 5 + 2105.1$ |
| | Uplink | $2012 \leq n \leq 2338$ | $n \div 5 + 2100$ |
| | | $2362 \leq n \leq 2687$ | $n \div 5 + 2030.1$ |
| Band VIII | Downlink | $2937 \leq n \leq 3088$ | $n \div 5 + 340$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-----------|---------------|-------------------------|---------------------|
| | Uplink | $2712 \leq n \leq 2863$ | $n \div 5 + 340$ |
| Band IX | Downlink | $9237 \leq n \leq 9387$ | $n \div 5$ |
| | Uplink | $8762 \leq n \leq 8912$ | $n \div 5$ |
| Band X | Downlink | $3112 \leq n \leq 3388$ | $n \div 5 + 1490$ |
| | | $3412 \leq n \leq 3687$ | $n \div 5 + 1430.1$ |
| | Uplink | $2887 \leq n \leq 3163$ | $n \div 5 + 1135$ |
| | | $3187 \leq n \leq 3462$ | $n \div 5 + 1075.1$ |
| Band XI | Downlink | $3712 \leq n \leq 3812$ | $n \div 5 + 736$ |
| | Uplink | $3487 \leq n \leq 3587$ | $n \div 5 + 733$ |
| Band XII | Downlink | $3837 \leq n \leq 3903$ | $n \div 5 - 37$ |
| | | $3927 \leq n \leq 3992$ | $n \div 5 - 54.9$ |
| | Uplink | $3612 \leq n \leq 3678$ | $n \div 5 - 22$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIII | Downlink | $4017 \leq n \leq 4043$ | $n \div 5 - 55$ |
| | | $4067 \leq n \leq 4092$ | $n \div 5 - 64.9$ |
| | Uplink | $3792 \leq n \leq 3818$ | $n \div 5 + 21$ |
| | | $3702 \leq n \leq 3767$ | $n \div 5 - 39.9$ |
| Band XIV | Downlink | $4117 \leq n \leq 4143$ | $n \div 5 - 63$ |
| | | $4167 \leq n \leq 4192$ | $n \div 5 - 72.9$ |
| | Uplink | $3892 \leq n \leq 3918$ | $n \div 5 + 12$ |
| | | $3942 \leq n \leq 3967$ | $n \div 5 + 2.1$ |
| Band XIX | Downlink | $712 \leq n \leq 763$ | $n \div 5 + 735$ |
| | | $787 \leq n \leq 837$ | $n \div 5 + 720.1$ |
| | Uplink | $312 \leq n \leq 363$ | $n \div 5 + 770$ |
| | | $387 \leq n \leq 437$ | $n \div 5 + 755.1$ |

CDMA 2000 / 1xEVDO Channel Number Ranges

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------|-----------------------------|-------------------------|-------------------------------------|
| US Cellular | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.030 \times N + 825.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 825.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 815.040$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.030 \times N + 870.000$ |
| | | $991 \leq N \leq 1023$ | $0.030 \times (N - 1023) + 870.000$ |
| | | $1024 \leq N \leq 1323$ | $0.030 \times (N - 1024) + 860.040$ |
| US PCS | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1850.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|------------------------|-----------------------------|-------------------------|--------------------------------------|
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $1930.000 + 0.050 \times N$ |
| Japan Cellular Band | Uplink (MS, reverse link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 915.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 898.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 887.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 893.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 799$ | $0.0125 \times (N + 860.000)$ |
| | | $801 \leq N \leq 1039$ | $0.0125 \times (N - 800) + 843.000$ |
| | | $1041 \leq N \leq 1199$ | $0.0125 \times (N - 1040) + 832.000$ |
| | | $1201 \leq N \leq 1600$ | $0.0125 \times (N - 1200) + 838.000$ |
| Korean PCS Band | Uplink (MS, reverse link) | $0 \leq N \leq 599$ | $0.050 \times N + 1750.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 599$ | $0.050 \times N + 1840.000$ |
| NMT-450 Band | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 410.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 451.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 479.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N - 1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N - 472) + 420.000$ |
| | | $1039 \leq N \leq 1473$ | $0.020 \times (N - 1024) + 461.010$ |
| | | $1536 \leq N \leq 1715$ | $0.025 \times (N - 1536) + 489.000$ |
| | | $1792 \leq N \leq 2016$ | $0.020 \times (N - 1792) + 489.000$ |
| IMT-2000 Band | Uplink (MS, reverse link) | $0 \leq N \leq 1199$ | $1920.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1199$ | $2100.000 + 0.050 \times N$ |
| Upper 700 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $776.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $746.000 + 0.050 \times N$ |
| Secondary 800 MHz Band | Uplink (MS, reverse link) | $0 \leq N \leq 719$ | $0.025 \times N + 806.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 896.000$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 719$ | $0.025 \times N + 851.000$ |
| | | $720 \leq N \leq 919$ | $0.025 \times (N - 720) + 935.000$ |
| 2.5 GHz IMT Extension | Uplink (MS, reverse link) | $0 \leq N \leq 1399$ | $2500.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1399$ | $2620.000 + 0.050 \times N$ |

| Band | Link (Device) | Range | Frequency (MHz) |
|-------------------|--------------------------------|-------------------------|-----------------------------------|
| US PCS 1.9 GHz | Uplink (MS, reverse link) | $0 \leq N \leq 1299$ | $1850.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 1299$ | $1930.000 + 0.050 \times N$ |
| AWS | Uplink (MS, reverse link) | $0 \leq N \leq 899$ | $1710.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 899$ | $2100.000 + 0.050 \times N$ |
| US 2.5 GHz | Uplink (MS, reverse link) | $140 \leq N \leq 1459$ | $2495.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $140 \leq N \leq 1459$ | $2617.000 + 0.050 \times N$ |
| 700 Public Safety | Uplink (MS, reverse link) | $0 \leq N \leq 240$ | $787.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 240$ | $757.000 + 0.050 \times N$ |
| C2K Lower 700 | Uplink (MS, reverse link) | $0 \leq N \leq 360$ | $698.000 + 0.050 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 360$ | $728.000 + 0.050 \times N$ |
| 400 Euro PAMR | Uplink (MS, reverse link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 450.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 410.000$ |
| | Uplink (MS, reverse link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 479.000$ |
| | Downlink (BS, forward link) | $1 \leq N \leq 400$ | $0.025 \times (N-1) + 460.000$ |
| | | $472 \leq N \leq 871$ | $0.025 \times (N-472) + 420.000$ |
| | Downlink (BS, forward link) | $1536 \leq N \leq 1715$ | $0.025 \times (N-1536) + 489.000$ |
| | Downlink (BS, forward link) | | |
| 800 PAMR | Uplink (MS, reverse link) | $0 \leq N \leq 239$ | $870.0125 + 0.025 \times N$ |
| | Downlink (BS, forward link) | $0 \leq N \leq 239$ | $915.0125 + 0.025 \times N$ |

LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier

frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | | Uplink | | | |
|------|---------------|----------|--------------|---------------|----------|---------------|
| | FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL |
| 1 | 2110 | | 0 | 0 - 599 | 1920 | 18000 - 18599 |
| 2 | 1930 | | 600 | 600 - 1199 | 1850 | 18600 - 19199 |
| 3 | 1805 | | 1200 | 1200 - 1949 | 1710 | 19200 - 19949 |
| 4 | 2110 | | 1950 | 1950 - 2399 | 1710 | 19950 - 20399 |
| 5 | 869 | | 2400 | 2400 - 2649 | 824 | 20400 - 20649 |
| 6 | 875 | | 2650 | 2650 - 2749 | 830 | 20650 - 20749 |
| 7 | 2620 | | 2750 | 2750 - 3449 | 2500 | 20750 - 20449 |
| 8 | 925 | | 3450 | 3450 - 3799 | 880 | 21450 - 21799 |
| 9 | 1844.9 | | 3800 | 3800 - 4149 | 1749.9 | 21800 - 22149 |
| 10 | 2110 | | 4150 | 4150 - 4749 | 1710 | 22150 - 22749 |
| 11 | 1475.9 | | 4750 | 4750 - 4949 | 1427.9 | 22750 - 22949 |
| 12 | 729 | | 5010 | 5010 - 5179 | 699 | 23010 - 23179 |
| 13 | 746 | | 5180 | 5180 - 5279 | 777 | 23180 - 23279 |
| 14 | 758 | | 5280 | 5280 - 5379 | 788 | 23280 - 23379 |
| ... | | | | | | |
| 17 | 734 | | 5730 | 5730 - 5849 | 704 | 23730 - 23849 |
| 18 | 860 | | 5850 | 5850 - 5999 | 815 | 23850 - 23999 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|-------------|--------|-------|---------------|
| 19 | 875 | 6000 | 6000 - 6149 | 830 | 24000 | 24000 - 24149 |
| 20 | 791 | 6150 | 6150 - 6449 | 832 | 24150 | 24150 - 24449 |
| 21 | 1495.9 | 6450 | 6450 - 6599 | 1447.9 | 24450 | 24450 - 24599 |
| ... | | | | | | |
| 24 | 1525 | 7700 | 7700 - 8039 | 1626.5 | 25700 | 25700 - 26039 |
| 25 | 1930 | 8040 | 8040 - 8689 | 1850 | 26040 | 26040 - 26689 |
| 26 | 859 | 8690 | 8690 - 9039 | 814 | 26690 | 26690 - 27039 |
| ... | | | | | | |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL_low + 0.1(NUL - NOffs-UL)$$

| Band | Downlink | Uplink | | | | |
|---------------|----------|--------------|---------------|----------|--------------|---------------|
| FDL_low (MHz) | NOffs-DL | Range of NDL | FUL_low (MHz) | NOffs-UL | Range of NUL | |
| 33 | 1900 | 36000 | 36000 - 36199 | 1900 | 36000 | 36000 - 36199 |
| 34 | 2010 | 36200 | 36200 - 36349 | 2010 | 36200 | 36200 - 36349 |
| 35 | 1850 | 36350 | 36350 - 36949 | 1850 | 36350 | 36350 - 36949 |
| 36 | 1930 | 36950 | 36950 - 37549 | 1930 | 36950 | 36950 - 37549 |

| Band | Downlink | Uplink | | | | |
|------|----------|--------|---------------|------|-------|------------------|
| 37 | 1910 | 37550 | 37550 -37749 | 1910 | 37550 | 37550 - 37749 |
| 38 | 2570 | 37750 | 37750 -38249 | 2570 | 37750 | 37750 - 38249 |
| 39 | 1880 | 38250 | 38250 -38649 | 1880 | 38250 | 38250 - 38649 |
| 40 | 2300 | 38650 | 38650 -39649 | 2300 | 38650 | 38650 - 39649 |
| 41 | 2496 | 39650 | 39650 - 41589 | 2496 | 39650 | 39650 - 41589 |
| 42 | 3400 | 41590 | 41590 - 43589 | 3400 | 41590 | 41590 - 43589 |
| 43 | 3600 | 43590 | 43590 - 45589 | 3600 | 43590 | 43590 - 45589 |

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

TDSCDMA Channel Number Ranges

1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio
Frequency Channel Number 1.28
Mcps TDD Option**

| Frequency Band | Frequency Range | UARFCN Uplink and Downlink transmission |
|---|-----------------|---|
| For operation in frequency band as defined in subclause 5.2 (a) | 1900–1920 MHz | 9504 to 9596 |
| | 2010–2025 MHz | 10054 to 10121 |
| For operation in frequency band as defined in subclause 5.2 (b) | 1850–1910 MHz | 9254 to 9546 |
| | 1930–1990 MHz | 9654 to 9946 |
| For operation in frequency band as defined in subclause 5.2 (c) | 1910–1930 MHz | 9554 to 9646 |
| For operation in frequency band as defined in subclause 5.2 (d) | 2570–2620 MHz | 12854 to 13096 |
| For operation in frequency band as defined in subclause 5.2 (e) | 2300–2400 MHz | 11504 to 11996 |
| For operation in frequency band as defined in subclause 5.2 (f) | 1880–1920 MHz | 9404 to 9596 |

Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

| Key Path | Source, Frequency |
|----------------------|-------------------|
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

| Key Path | Source, Frequency, Radio Setup |
|-----------------------|---|
| Remote Command | :SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 |

BAND11 | BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 |
 BAND21 | BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND29 | BAND30 |
 BAND31 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 |
 BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB | BANDC |
 BANDD | BANDE | BANDF

:SOURce:FREQuency:CHANnels:BAND?

| | |
|-----------------------------|---|
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Notes | Set this setting to "NONE" will grey out "Channel" on page 2504 Channel |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PGSM |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the active channel band.

| | |
|-----------------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND EGSM |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND RGSM |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND DCS1800 |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND PCS1900 |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM450 |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM480 |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM850 |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND GSM700 |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE |
| Example | :SOUR:FREQ:CHAN:BAND T-GSM810 |
| Initial S/W Revision | A.05.00 |

WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDI |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDII |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIII |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIV |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDV |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVI |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVII |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDVIII |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDIX |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDX |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXI |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXII |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects band XIII as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIII |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the active channel band.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, WCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDXIV |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND USCELL |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND JAPAN |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND KOREAN |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND NMT |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMT2K |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND UPPER |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND SECOND |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR400 |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PAMR800 |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND IMTEXT |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PCS1DOT9G |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND AWS |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND US2DOT5G |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND PUBLIC |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the active channel band.

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Example | :SOUR:FREQ:CHAN:BAND LOWER |
| Initial S/W Revision | A.05.00 |

LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND1 |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND2 |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND3 |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND4 |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND5 |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND6 |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND7 |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND8 |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND9 |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND10 |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND11 |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND12 |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND13 |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND14 |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND17 |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND18 |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND19 |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND20 |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND21 |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND24 |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND25 |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND26 |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND27 |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
| Example | :SOUR:FREQ:CHAN:BAND BAND28 |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE |
|----------|--|

| | |
|----------------------|-----------------------------|
| Example | :SOUR:FREQ:CHAN:BAND BAND31 |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND44 |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the

source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

| | |
|--------------------------------------|---|
| Key Path | Source, Frequency, Radio Setup |
| Remote Command | :SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK? |
| Example | :SOUR:RAD:BAND:LINK UP |
| Preset | DOWN |
| Range | DOWN UP |
| Backwards Compatibility SCPI | :SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce? |
| Backwards Compatibility Notes | BTS maps to the Downlink frequency MS maps to the Uplink frequency |
| Initial S/W Revision | A.05.00 |

Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} - \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

NOTE

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

| | |
|-----------------|--------------------------|
| Key Path | Source, Frequency |
|-----------------|--------------------------|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence:SET |
| Example | :SOUR:FREQ:REF:SET |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Initial S/W Revision | A.05.00 |

Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 2532](#)

| Key Path | Source, Frequency |
|-----------------------------|--|
| Remote Command | :SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe? |
| Example | :SOUR:FREQ:REF 0.00 Hz :SOUR:FREQ:REF:STATe ON |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Couplings | The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON. |
| Preset | 0.00 Hz OFF |
| Min | 0.00 Hz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source > Frequency > Frequency

offset value equals the value entered under Source > Frequency > Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source > Frequency > Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source > Frequency > Frequency

offset frequency equals the value previously entered and set under Source > Frequency > Freq Offset

| | |
|-----------------------------|--|
| Key Path | Source, Frequency |
| Remote Command | :SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet? |
| Example | :SOUR:FREQ:OFFS 0 Hz |
| Dependencies | This setting is unavailable, and is grayed out when the List Sequencer is turned ON. |
| Preset | 0 Hz |
| Min | -100.00 GHz |
| Max | 100.00 GHz |
| Initial S/W Revision | A.05.00 |

Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 2535, "AM" on page 2581, "FM" on page 2583, and "PM" on page 2584.

| | |
|-----------------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

ARB

Allows you access to the ARB sub-menus.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]? |
| Example | :SOUR:RAD:ARB OFF :SOUR:RAD:ARB? |
| Notes | If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished. |
| Dependencies | This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 2586 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 2586 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately. The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "- When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported |
| Couplings | If "Real-Time AWGN" on page 2546 AWGN State is On and this setting is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (Add couplings with AWGN state) |

Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Remote Command | :SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform? |
| Example | :SOUR:RAD:ARB:WAV "test_waveform.bin" |
| Notes | <p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.</p> <p>If the ARB is ON, and you attampt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.</p> <p>If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generatedand the file selection remains unchanged.</p> <p>If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p> |

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Remote Command :SOURce:RADio:ARB:LOAD:ALL <string>

Example :SOUR:RAD:ARB:LOAD:ALL "D: varb"

Notes <string> - specifies the directory on the HDD to load the files into ARB memory from.
 When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path **Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk**

Notes No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for

selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELete <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

NOTE

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 2540**.

| | |
|----------------------|--|
| Remote Command | :SOURce:RADio:ARB:CATalog? |
| Example | :SOUR:RAD:ARB:CATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> <p><integer> - memory free</p> <p><string> ... - comma separated list of waveform segments within ARB memory</p> |
| Initial S/W Revision | A.05.00 |

Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

| | |
|----------------|---|
| Remote Command | :SOURce:RADio:ARB:FCATalog? |
| Example | :SOUR:RAD:ARB:FCATalog? |
| Notes | <p>The return data is in the following format:</p> <p><integer> - memory used</p> |

| | |
|----------------------|---|
| | <integer> - memory free <integer> - file count in ARB memory <string>, <string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm" |
| Initial S/W Revision | A.09.00 |

ARB Setup

Allows access to the ARB setup sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Sample Rate

Allows you to set the ARB waveform playback sample rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE? |
| Example | :SOUR:RAD:ARB:SCL:RATE 48.00 MHz |
| Notes | If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing. |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 125.00 MHz |
| Min | 1.00 kHz |
| Max | 125.00 MHz |
| Initial S/W Revision | A.05.00 |

Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
|----------|---|

| | |
|-----------------------------|--|
| Remote Command | :SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling? |
| Example | :SOUR:RAD:ARB:RSC 100.00 |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 70.00 % |
| Min | 1.00 % |
| Max | 100.00 % |
| Initial S/W Revision | A.05.00 |

Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Remote Command | :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet? |
| Example | :SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 Hz |
| Min | -50.00 MHz |
| Max | 50.00 MHz |
| Initial S/W Revision | A.05.00 |

Edit RMS

Allows you to edit or calculate current RMS of selected waveform.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Initial S/W Revision | A.14.50 |

Current RMS

Allows you to directly specify current RMS value used to playback currently selected waveform. Please note incorrect RMS value may cause inaccurate power output in E6640A that is sensitive to RMS value.

This setting is also updated by RMS in waveform header or updated when invoking RMS calculation operation.

This setting can be saved to the header of currently selected waveform by invoking ["Save Setup To Header" on page 2580](#) "Save Setup To Header".

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS <float> :SOURce:RADio:ARB:RMS? |
| Example | :SOUR:RAD:ARB:HEAD:RMS 0.7 :SOUR:RAD:ARB:HEAD:RMS? |
| Notes | Valid range is 0 to 1.414, values outside the range will be clipped to the closest boundary. Note this value does not affect "List Sequencer" on page 2585 Source List Sequencer that always uses RMS value resides in each ARB header. If want this value to take effect in list sequencer, use "Save Setup To Header" on page 2580 "Save Setup to Header" to save current RMS value to header first, then play the ARB in source list sequencer. |
| Dependencies | When a new waveform is selected for playback, this setting is updated by the RMS value defined in associated waveform header file. If selected waveform has no associated header file or header file does not specify RMS value, then instrument will try to calculate out one automatically. Calculating RMS can also update this setting. |
| Preset | 0 |
| Range | 0 ~ 1.414 |
| Initial S/W Revision | A.14.50 |

RMS Calculation Mode

Allows you to specify the mode to calculate the current RMS.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulation:MODE AUTO M1 M2 M3 M4 :SOURce:RADio:ARB:RMS:CALCulation:MODE? |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Notes | If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. |
| Preset | AUTO |
| Range | AUTO M1 M2 M3 M4 |
| Initial S/W Revision | A.14.50 |

Auto

RMS will be calculated based on the whole sample range of current selected waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE AUTO |
| Initial S/W Revision | A.14.50 |

Marker 1

Selects marker 1 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M1 |
| Initial S/W Revision | A.14.50 |

Marker 2

Selects marker 2 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M2 |
| Initial S/W Revision | A.14.50 |

Marker 3

Selects marker 3 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M3 |
| Initial S/W Revision | A.14.50 |

Marker 4

Selects marker 4 to designate sample range used for RMS calculation.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS, RMS Calculation Mode , Marker |
| Example | :SOUR:RAD:ARB:RMS:CALC:MODE M4 |
| Initial S/W Revision | A.14.50 |

Calculate RMS

Allows you to calculate current RMS based on mode selected. This will update ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, Calculate RMS |
| Remote Command | :SOURce:RADio:ARB:RMS:CALCulate |
| Example | :SOUR:RAD:ARB:RMS:CALC |
| Notes | <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> <p>If no waveform is selected, or selected waveform is waveform sequence, the key will grey out.</p> <p>If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” is set to marker, under this circumstance, invoking calculation operation will get error “-221 Setting conflict; There is no marker for currently selected waveform, auto RMS calculation mode is used instead”, and "RMS Calculation Mode" on page 2543 “RMS Calculation Mode” will be coupled to “Auto” mode automatically.</p> <p>RMS calculation does not suit for waveform sequence. If selected waveform is waveform sequence file, invoking this operation will get error “-221 Setting conflict; RMS calculation does not apply to waveform sequence”. But users can still edit current RMS as play parameter, and can save current RMS to waveform sequence header for later use.</p> |
| Initial S/W Revision | A.14.50 |

Use Header RMS

Allows you to quickly set RMS in ARB header to ["Current RMS" on page 2543](#) Current RMS setting.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Edit RMS, |
| Notes | <p>No remote command, front panel only.</p> <p>If no waveform is selected, the key will grey out.</p> <p>If no waveform is selected, invoking this operation will get error “-221 Setting conflict; No waveform is selected for RMS operation”.</p> |
| Initial S/W Revision | A.14.50 |

Real-Time AWGN Setup

The source allows you to apply additive white Gaussian noise (AWGN) to a carrier in real time while the modulating waveform plays in the dual ARB player. Pressing this key allows access to the real time AWGN sub-menus and changes the central display area to show the AWGN Setup view.

This feature is controlled by E6650A-AW1 option

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup |
| Notes | This menu only appears and related SCPIs are only available when E6650A-AW1 option presents. |
| Initial S/W Revision | A.16.00 |

Real-Time AWGN

Allows you to enable or disable adding real-time AWGN to the carrier modulated by the waveform currently being played by the dual ARB.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe[:STATe] ON OFF 1 0 :SOURce:RADio:ARB:NOISe[:STATe]? |
| Example | :SOUR:RAD:ARB:NOIS OFF |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN state is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN state is updated with the value from the header file. The AWGN state will remain unchanged if the newly selected waveform does not have an associated header file. |
| Couplings | If this setting is On and "ARB" on page 2535 ARB State is On, "RF Power" on page 2500 RF Power will be adjusted to the value to maintain the AWGN power relationship defined by "Power Control Mode" on page 2547 Power Control Mode and other noise settings |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.16.00 |

Carrier To Noise Ratio

Allows you to specify the carrier to noise ratio (C/N) in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:CN <ampl> :SOURce:RADio:ARB:NOISe:CN? |
| Example | :SOUR:RAD:ARB:NOIS:CN 0.00 dB |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN C/N ratio is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN C/N ratio is updated with the value from the header file. The AWGN C/N ratio will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 0.00 dB |
| Min | -100.00 dB |
| Max | 100.00 dB |
| Initial S/W Revision | A.16.00 |

Carrier Bandwidth

Allows you to specify the bandwidth over which the AWGN is applied. The carrier RMS power and the noise power are integrated over the selected carrier bandwidth for the purpose of calculating carrier to noise ratio (C/N).

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:CBWidth <freq> :SOURCE:RADio:ARB:NOISe:CBWidth? |
| Example | :SOUR:RAD:ARB:NOIS:CBW 1.00 Hz |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Min | 1.00 Hz |
| Max | 200.00 MHz |
| Initial S/W Revision | A.16.00 |

Noise Bandwidth

Allows you to specify the flat noise bandwidth of the real-time noise for an ARB waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURCE:RADio:ARB:NOISe:BANDwidth <freq> :SOURCE:RADio:ARB:NOISe:BANDwidth? |
| Example | :SOUR:RAD:ARB:NOIS:BAND 1.00 Hz |
| Notes | Generally, flat noise bandwidth should be set slightly wider than the carrier bandwidth (typically 1.6 times wider) |
| Notes | Max Noise Bandwidth equals $0.8 * \text{Maximum ARB Sample Rate}$ reported in HW capability |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The AWGN carrier bandwidth is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the AWGN carrier bandwidth is updated with the value from the header file. The AWGN carrier bandwidth will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 160.00 MHz |
| Initial S/W Revision | A.16.00 |

Power Control Mode

This setting offers four ways to control the RF output power when adding AWGN to a signal.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup |
| Remote Command | :SOURce:RADio:ARB:NOISe:POWeR:CONTRol[:MODE] TOTal CARRier NOISe NCHannel :SOURce:RADio:ARB:NOISe: POWer:CONTRol[:MODE]? |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NCHannel :SOUR:RAD:ARB:NOIS:POW:CONT? |
| Preset | TOTal |
| Range | Total Power Carrier Power Total Noise Power Noise Power in Channel |
| Initial S/W Revision | A.16.00 |

Total

Set the power control mode as total power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT TOTal |
| Couplings | Set to this value will make Carrier Power Carrier Power, Total Noise Power Total Noise Power, and Channel Noise Power Channel Noise Power buttons invisible on menu. Selecting Total as the power control mode makes the total power and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the total power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the total power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Carrier

Set the power control mode as carrier power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT CARRier |
| Couplings | Set to this value will make Carrier Power Carrier Power button visible, while Total Noise Power Total Noise Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Carrier as the power control mode makes the carrier power and C/N independent variables while making the total power and total noise power dependent variables. The dependent variables total power and total noise power are set by the carrier power, C/N, and the rest of the Noise settings. The total power and total noise power change as any noise parameter is adjusted to keep the carrier power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Total Noise

Set the power control mode as total noise power.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NOISe |
| Couplings | Set to this value will make Total Noise Power Total Noise Power button visible, while Carrier Power Carrier Power and Channel Noise Power Channel Noise Power buttons invisible from menu. Selecting Total Noise as the power control mode makes the total noise power and C/N independent variables while making the total power and carrier power dependent variables. The dependent variables total power and carrier power are set by the total noise power, C/N, and the rest of the Noise settings. The total power and carrier power change as any noise parameter is adjusted to keep the total noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Channel Noise

Set the power control mode as channel noise power.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, ARB Setup, Real-Time AWGN Setup, Power Control Mode |
| Example | :SOUR:RAD:ARB:NOIS:POW:CONT NChannel |
| Couplings | Set to this value will make Channel Noise Power Channel Noise Power button visible, while Total Noise Power Total Noise Power and Carrier Power Carrier Power buttons invisible from menu. Selecting Channel Noise as the power control mode makes the noise power in channel and C/N independent variables while making the carrier power and total noise power dependent variables. The dependent variables carrier power and total noise power are set by the channel noise power, C/N, and the rest of the Noise settings. The carrier power and total noise power change as any noise parameter is adjusted to keep the channel noise power and the C/N at their last specified values. |
| Initial S/W Revision | A.16.00 |

Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE CONTInuous SINGle SADVance :SOURce:RADio:ARB:TRIGger:TYPE? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE? |
| Notes | Gated trigger type will be implemented at a later release |
| Preset | CONTInuous |
| Range | Continuous Single Seg Adv |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Preset | FREE |
| Range | Free Run Trigger + Run Reset + Run |
| Initial S/W Revision | A.05.00 |

Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT FREE |
| Initial S/W Revision | A.05.00 |

Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG |
| Initial S/W Revision | A.05.00 |

Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Continuous |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:CONT RES |
| Initial S/W Revision | A.05.00 |

Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:RETRigger ON OFF IMMediate :SOURce:RADio:ARB:RETRigger? |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Notes | ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1. |
| Preset | ON |
| Range | No Retrigger Buffered Trigger Restart on Trigger |
| Initial S/W Revision | A.05.00 |

No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR OFF |
| Initial S/W Revision | A.05.00 |

Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR ON |
| Initial S/W Revision | A.05.00 |

Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Single |
| Example | :SOUR:RAD:ARB:RETR IMM |
| Initial S/W Revision | A.05.00 |

Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type |
| Remote Command | :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]? |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Preset | CONTInuous |
| Range | Single Continuous |
| Initial S/W Revision | A.05.00 |

Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV SING |
| Initial S/W Revision | A.05.00 |

Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Trigger Type, Segment Advance |
| Example | :SOUR:RAD:ARB:TRIG:TYPE:SADV CONT |
| Initial S/W Revision | A.05.00 |

Trigger Source

The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Remote Command | :SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]? |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Dependencies | This key is grayed out if the current trigger type is Continuous, Free Run. |
| Preset | EXTernal2 |
| Range | Trigger Key Bus External 2 |
| Initial S/W Revision | A.05.00 |

Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger KEY |
| Initial S/W Revision | A.05.00 |

Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger BUS |
| Initial S/W Revision | A.05.00 |

External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Trigger Source |
| Example | :SOUR:RAD:ARB:TRIGger EXT2 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty. |
| Initial S/W Revision | A.05.00 |

Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Notes | No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURCE:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the

same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List</p> |

["Sequencer" on page 2585](#) and ["Sequencer" on page 2586](#) state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
|----------|---|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 2614](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 2540](#).

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, SCPI front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | 65535 |
| Initial S/W Revision | A.05.00 |

Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform |
| Notes | No remote command, front panel only. |
| Preset | Enabled |
| Range | Enabled Disabled |
| Initial S/W Revision | A.05.00 |

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence |
| Initial S/W Revision | A.05.00 |

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 2554](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

Remote Command :SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 2563](#) "For Setup SCPI".)

:SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 2564](#) below.)

Example

For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

Notes**For Setup SCPI**

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports

MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.
 If the waveform sequence file name is empty, an error is generated.
 If the specified waveform sequence file cannot be found, an error is generated.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Sequences |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Waveform Utilities

Allows you access to the waveform utilities sub-menus.

| | |
|----------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities |
| Dependencies | This key is only available if there is at least one Multi-pack license installed on the instrument. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if there is at least one slot available within at least one multi-pack license. |
| Initial S/W Revision | A.05.00 |

Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string> |
| Example | SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm" |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Keysight signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . |
| Dependencies | This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin" |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even if required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL "D: varb" |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPIfront panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" |

| | |
|----------------------|---|
| | :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive |
|----------|--|

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.09.00 |
|----------------------|------------------|

Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Dependencies | This key is only available if the currently selected slot is in the trial state. |
| Initial S/W Revision | A.05.00 |

Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Remote Command | :SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LiCense[:FPACK]:WAVeform:REPLace <int>, <string> |
| Example | SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LiC:WAV:REPL 1, "myotherwaveform.wfm" |
| Notes | The second SCPI :SYSTem:LiCense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Keysight signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses |
| Remote Command | :SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LIcense[:FPACK]:WAVeform:CLEar <int> |
| Example | SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1 |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |

Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state.

Initial S/W Revision A.05.00

Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path **Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses**

Remote Command :SYSTem:LKEY:WAVeform:LOCK <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>

Example SYST:LKEY:WAV:LOCK 1
or
SYST:LIC:WAV:LOCK 1

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

Dependencies This key is only available if the currently selected slot is in the trial state or the lock required state.

Initial S/W Revision A.05.00

Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

Remote Command :SYSTem:LKEY:WAVeform:STATus? <int>
or
:SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>

Example :SYST:LKEY:WAV:STAT? 1
<"Locked"
or
:SYST:LIC:WAV:STAT? 1
<"Locked"

Notes The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Keysight signal sources. You can use either one of them.
Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.

| | |
|----------------------|--|
| | error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. |
| Range | "Locked" "Available" "Trail" "LockRequired" "Nonexistent" |
| Initial S/W Revision | A.05.00 |

Slots Free Query (Remote Command Only)

Returns the number of license slots free.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE? |
| Example | :SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Used Query (Remote Command Only)

Returns the number of license slots used.

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED? |
| Example | :SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED? |
| Notes | The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Keysight signal sources. You can use either one of them. |
| Initial S/W Revision | A.05.00 |

Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

| | |
|-----------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int> |
|-----------------------|---|

| | |
|-----------------------------|---|
| Example | :SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned. |
| Initial S/W Revision | A.12.00 |

Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

| | |
|-----------------------------|---|
| Remote Command | :SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LICense[:FPACK]:WAVeform:UID? <int> |
| Example | :SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140" |
| Notes | Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then "0" is returned |
| Initial S/W Revision | A.12.00 |

Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm" |
| Initial S/W Revision | A.11.00 |

Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:RADio:ARB:MPLicensed:UID:LOCKed? |
| Example | SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266" |
| Notes | Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list |
| Initial S/W Revision | A.11.00 |

Marker Utilities

Allows access to the marker utilities sub-menus.

| | |
|-----------------------------|--------------------------------------|
| Key Path | Source, Modulation Setup, ARB |
| Initial S/W Revision | A.05.00 |

Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Mkr 1 Polarity

Allows you to set the polarity of marker 1.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1? |
| Example | :SOUR:RAD:ARB:MPOL:MARK1 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 2 Polarity

Allows you to set the polarity of marker 2.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2? |
| Example | :SOUR:RAD:ARB:MPOL:MARK2 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 3 Polarity

Allows you to set the polarity of marker 3.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3? |
| Example | :SOUR:RAD:ARB:MPOL:MARK3 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Mkr 4 Polarity

Allows you to set the polarity of marker 4.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity |
| Remote Command | :SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4? |

| | |
|-----------------------------|---|
| Example | :SOUR:RAD:ARB:MPOL:MARK4 NEG |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file. |
| Preset | Pos |
| Range | Neg Pos |
| Initial S/W Revision | A.05.00 |

Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities |
| Initial S/W Revision | A.05.00 |

Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:PULSe? |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing |
| Remote Command | :SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold? |
| Example | :SOUR:RAD:ARB:MDES:ALCH NONE |
| Dependencies | When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file. |
| Range | None M1 M2 M3 M4 |
| Initial S/W Revision | A.05.00 |

None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS NONE |
| Initial S/W Revision | A.05.00 |

Marker 1

Sets marker 1 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M1 |
| Initial S/W Revision | A.05.00 |

Marker 2

Sets marker 2 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M2 |
| Initial S/W Revision | A.05.00 |

Marker 3

Sets marker 3 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M3 |
| Initial S/W Revision | A.05.00 |

Marker 4

Sets marker 4 to be used for the ALC hold function.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold |
| Example | :SOUR:RAD:ARB:MDES:PULS M4 |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:CLEar |
| Example | :SOUR:RAD:ARB:HEAD:CLE |
| Notes | Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |

Save Setup To Header

Allows you to save new file header information details to the file.

| | |
|--------------------------|---|
| Key Path | Source, Modulation Setup, ARB, Header Utilities |
| Remote Command | :SOURce:RADio:ARB:HEADer:SAVE |
| Example | :SOUR:RAD:ARB:HEAD:SAVE |
| Notes | Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error. |
| Initial S/W Revision | A.05.00 |
| Modified at S/W Revision | A.16.00 (AWGN settings will be saved to header as well) |

Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

| | |
|----------------------|--|
| Remote Command | :MMEMory:HEADer:ID? "<file name>" |
| Example | :MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS) |
| Notes | SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk. If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned |
| Initial S/W Revision | A.09.00 |

Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

| | |
|----------------------|------------------------------------|
| Remote Command | :SOURce:RADio:ARB:TRIGger:INITiate |
| Example | :SOUR:RAD:ARB:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

AM

Allows access to the menu for configuring the Amplitude Modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:STATe :SOURce:AM:STATe? |
| Example | :SOUR:AM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

AM Depth

Allows you to set the amplitude modulation depth in percent.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]? |
| Example | :SOUR:AM 0.1 |
| Preset | 0.1 % |
| Min | 0.1 % |
| Max | 95.0 % |
| Initial S/W Revision | A.05.00 |

AM Rate

Allows you to set the internal amplitude modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, AM |
| Remote Command | :SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency? |
| Example | :SOUR:AM:INT:FREQ 40.0 Hz |

| | |
|----------------------|----------|
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

FM

Allows access to the menu for configuring the frequency modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|-----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:STATe :SOURce:FM:STATe? |
| Example | :SOUR:FM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

FM Deviation

Allows you to set the frequency modulation deviation.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM[:DEViation] :SOURce:FM[:DEViation]? |
| Example | :SOUR:FM 1.00 kHz |
| Preset | 1.00 Hz |
| Min | 1.00 Hz |
| Max | 100.00 kHz |
| Initial S/W Revision | A.05.00 |

FM Rate

Allows you to set the internal frequency modulation rate.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, FM |
| Remote Command | :SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency? |
| Example | :SOUR:FM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

PM

Allows access to the menu for configuring the phase modulation.

| | |
|----------------------|---------------------------------|
| Key Path | Source, Modulation Setup |
| Initial S/W Revision | A.05.00 |

PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

| | |
|----------------------|---------------------------------------|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:STATe :SOURce:PM:STATe? |
| Example | :SOUR:PM:STAT OFF |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

PM Deviation

Allows you to set the phase modulation deviation.

| | |
|----------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM[:DEViation] :SOURce:PM[:DEViation]? |

| | |
|----------------------|-------------------|
| Example | :SOUR:PM 1.00 rad |
| Preset | 0.1 rad |
| Min | 0.1 rad |
| Max | 20.0 rad |
| Initial S/W Revision | A.05.00 |

PM Rate

Allows you to set the internal phase modulation rate.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, PM |
| Remote Command | :SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency? |
| Example | :SOUR:PM:INT:FREQ 40.0 Hz |
| Preset | 400.0 Hz |
| Min | 10 Hz |
| Max | 40 kHz |
| Initial S/W Revision | A.05.00 |

List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in ["Step Configuration \(Remote Command Only\)" on page 2619](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

| | |
|----------------------|---------------|
| Key Path | Source |
| Initial S/W Revision | A.05.00 |

Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]? |
| Example | :SOUR:LIST OFF |
| Notes | When the sequencer is set to ON, the list sequencer controls the output of the source. |
| Couplings | When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected. |
| Preset | Off |
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGger[:IMMediate] |
| Example | :SOUR:LIST:TRIG |
| Notes | When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " Query List Sequence Initiation Armed Status (Remote Command Only) " on page 2630 Query Source List Sequence Armed Status) |
| Dependencies | Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled. |
| Initial S/W Revision | A.05.00 |

List Sequencer Setup

Allows you access to the list sequencer setup menus.

| | |
|----------|-------------------------------|
| Key Path | Source, List Sequencer |
|----------|-------------------------------|

Number of Steps

Allows you to specify the number of steps within the list sequence.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs? |
| Example | :SOUR:LIST:NUMB:STEP 1 |
| Notes | Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps. |
| Dependencies | The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer. |
| Preset | 1 |
| Min | 1 |
| Max | 1000 |
| Initial S/W Revision | A.05.00 |

Current Step

Allows you to select the step number you wish to view or edit.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Preset | 1 |
| Min | 1 |
| Max | Step Count |
| Initial S/W Revision | A.05.00 |

Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of

1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key. |
| Initial S/W Revision | A.05.00 |

Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key |
| Initial S/W Revision | A.05.00 |

Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Initial S/W Revision | A.05.00 |

Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INTERNAL EXTERNAL2 KEY BUS EXTERNAL4 :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Free Run |
| Range | Free Run Internal Manual (Trigger Key) Bus External 2 EXTERNAL4 |
| Initial S/W Revision | A.05.00 |

Free Run

Sets the trigger input for the current step to Free Run.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG IMM |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Internal

Sets the trigger input for the current step to Internal.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG INT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG KEY |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG BUS |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

External 2

Sets the trigger input for the current step to External 2.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Trigger |
| Example | :SOUR:LIST:STEP2:SET:INP:TRIG EXT2 |
| Notes | SCPI is supported after A.09.40 |
| Notes | Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error. |
| Initial S/W Revision | A.05.00 |

Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

| Value Changed | Recommended Transition Time |
|---------------|---|
| Frequency | 500 μ s |
| Amplitude | 100 μ s to within 0.1 dB 20 μ s to within 1.0 dB |

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME? |

| | |
|----------------------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
| Preset | 1.0 ms |
| Min | 0.0 ms |
| Max | 4.0 ks |
| Initial S/W Revision | A.05.00 |

Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Notes | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADIo:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND27 BAND28 BAND29 BAND30 BAND31 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BAND44 BANDA BANDB BANDC BANDD BANDE BANDF :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADIo:BAND? |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND? |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

None

Selects no radio standard for use on the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND NONE |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

P-GSM

Selects P-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

E-GSM

Selects E-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

R-GSM

Selects R-GSM as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

DCS 1800

Selects DCS 1800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

PCS 1900

Selects PCS 1900 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 450

Selects GSM 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 480

Selects GSM 480 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 850

Selects GSM 850 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

GSM 700

Selects GSM 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

T-GSM 810

Selects T-GSM 810 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE |
| Initial S/W Revision | A.05.00 |

WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

Band I

Selects Band I as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band II

Selects Band II as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band III

Selects Band III as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IV

Selects Band IV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band V

Selects Band V as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VI

Selects Band VI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VII

Selects Band VII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band VIII

Selects Band VIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band IX

Selects Band IX as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band X

Selects Band X as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XI

Selects Band XI as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XII

Selects Band XII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIII

Selects Band XIII as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

Band XIV

Selects Band XIV as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA |
| Initial S/W Revision | A.05.00 |

CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.05.00 |

US CELL

Selects US Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS

Selects US PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Japan Cell

Selects Japan Cell as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Korean PCS

Selects Korean PCS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

NMT 450

Selects NMT 450 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

IMT 2000

Selects IMT 2000 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Upper 700

Selects Upper 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

Secondary 800

Selects Secondary 800 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

800 PAMR

Selects 800 PAMR as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

AWS

Selects AWS as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

700 Public Safety

Selects 700 Public Safety as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO |
| Initial S/W Revision | A.05.00 |

LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard |
| Initial S/W Revision | A.09.50 |

BAND 1

Selects BAND 1 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 2

Selects BAND 2 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 3

Selects BAND 3 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 4

Selects BAND 4 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 5

Selects BAND 5 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 6

Selects BAND 6 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 7

Selects BAND 7 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 8

Selects BAND 8 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 9

Selects BAND 9 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 10

Selects BAND 10 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 11

Selects BAND 11 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 12

Selects BAND 12 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 13

Selects BAND 13 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 14

Selects BAND 14 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 17

Selects BAND 17 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 18

Selects BAND 18 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 19

Selects BAND 19 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 20

Selects BAND 20 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 21

Selects BAND 21 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 24

Selects BAND 24 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 25

Selects BAND 25 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.09.50 |

BAND 26

Selects BAND 26 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.12.53 |

BAND 27

Selects BAND 27 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 28

Selects BAND 28 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

BAND 31

Selects BAND 31 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE |
| Initial S/W Revision | A.14.00 |

LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND 33

Selects BAND 33 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND33 |
| Initial S/W Revision | A.11.50 |

BAND 34

Selects BAND 34 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND34 |
| Initial S/W Revision | A.11.50 |

BAND 35

Selects BAND 35 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND35 |
| Initial S/W Revision | A.11.50 |

BAND 36

Selects BAND 36 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND36 |
| Initial S/W Revision | A.11.50 |

BAND 37

Selects BAND 37 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND37 |
| Initial S/W Revision | A.11.50 |

BAND 38

Selects BAND 38 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND38 |
| Initial S/W Revision | A.11.50 |

BAND 39

Selects BAND 39 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND39 |
| Initial S/W Revision | A.11.50 |

BAND 40

Selects BAND 40 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND40 |
| Initial S/W Revision | A.11.50 |

BAND 41

Selects BAND 41 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND41 |
| Initial S/W Revision | A.11.50 |

BAND 42

Selects BAND 42 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND42 |
| Initial S/W Revision | A.11.50 |

BAND 43

Selects BAND 43 as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, LTE TDD |
| Example | :SOUR:FREQ:CHAN:BAND BAND43 |
| Initial S/W Revision | A.11.50 |

BAND 44

Selects BAND 44 as the band for the current step.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD |
| Initial S/W Revision | A.14.00 |

TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

| | |
|----------------------|---|
| Key Path | Source, Frequency, Radio Setup, Radio Standard |
| Initial S/W Revision | A.11.50 |

BAND A

Selects BAND A as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDA |
| Initial S/W Revision | A.11.50 |

BAND B

Selects BAND B as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDB |
| Initial S/W Revision | A.11.50 |

BAND C

Selects BAND C as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDC |
| Initial S/W Revision | A.11.50 |

BAND D

Selects BAND D as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDD |
| Initial S/W Revision | A.11.50 |

BAND E

Selects BAND E as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDE |
| Initial S/W Revision | A.11.50 |

BAND F

Selects BAND F as the band for the current step.

| | |
|----------------------|--|
| Key Path | Source, Frequency, Radio Setup, Radio Standard, TDSCDMA |
| Example | :SOUR:FREQ:CHAN:BAND BANDF |
| Initial S/W Revision | A.11.50 |

Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Radio Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? |

| | |
|----------------------|--|
| Example | :SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK? |
| Notes | SCPI is supported after A.09.40 |
| Preset | DOWN |
| Range | DOWN UP |
| Initial S/W Revision | A.05.00 |

Channel

Allows you to specify the frequency of the current step via a channel number.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number. |
| Preset | 1 |
| Min | 0 (Please refer to for valid ranges.) |
| Max | 10838 (Please refer to for valid ranges.) |
| Initial S/W Revision | A.05.00 |

Frequency

Allows you to specify a frequency value for the current step.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency? |
| Example | :SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR? |
| Notes | SCPI is supported after A.09.40. |

| | |
|----------------------|--|
| | This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number. |
| Couplings | The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated. |
| Preset | 1.00 GHz |
| Min | 10.00 MHz |
| Max | Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz |
| Initial S/W Revision | A.05.00 |

Power

Allows you to specify a power value for the current step.

| | |
|----------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? |
| Example | :SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL? |
| Notes | SCPI is supported after A.09.40 |
| Notes | Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested. The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON. |
| Notes | The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec. |
| Dependencies | The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values. |
| Preset | -100 dBm |

| | |
|----------------------|--|
| Min | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Max | The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 2500 and the table RF Power Range for the valid ranges. |
| Initial S/W Revision | A.05.00 |

Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVeform? |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV? |
| Notes | SCPI is supported after A.09.40 |
| Remote Command Notes | String type, takes "Off" "CW" "Cont" "waveform name" |
| Preset | CW |
| Range | Waveform Continue Previous CW Off |
| Initial S/W Revision | A.05.00 |

CW

Sets the current step to output a CW tone.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "CW" |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Example | :SOUR:LIST:STEP2:SET:WAV "waveform name" |
| Notes | SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list |

sequence will automatically apply header settings of the selected waveform in that step.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|---------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Cont" |
|----------------|---------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Off

Disable RF output of the current step.

| | |
|----------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
|----------|---|

| | |
|----------------|--------------------------------|
| Example | :SOUR:LIST:STEP2:SET:WAV "Off" |
|----------------|--------------------------------|

| | |
|-------|---------------------------------|
| Notes | SCPI is supported after A.09.40 |
|-------|---------------------------------|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

| | |
|----------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
|----------|---|

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

"NVWFM" (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. "NVWFM" MSUS will be mapped to the

default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

| | |
|-----------------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD <string> |
| Example | :SOUR:RAD:ARB:LOAD “D: VARB\testwaveform.bin” or :SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin” |
| Notes | <p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p><string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.</p> |
| Initial S/W Revision | A.05.00 |

Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:LOAD:ALL <string> |
| Example | :SOUR:RAD:ARB:LOAD:ALL “D: varb” |
| Notes | <p><string> - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a</p> |

directory to ARB memory is rejected with an error.
 When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

| | |
|----------------------|---------|
| Initial S/W Revision | A.05.00 |
|----------------------|---------|

Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

| | |
|----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Notes | No remote command, SCPI front panel only. |
| Initial S/W Revision | A.05.00 |

Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk |
| Remote Command | :SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory? |
| Example | :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR? |
| State Saved | Persistent, survives a power cycle and a preset but not saved in the instrument state |
| Initial S/W Revision | A.05.00 |

Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

| | |
|----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform |
| Initial S/W Revision | A.05.00 |

Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

| | |
|-----------------------|---|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe <string> |
| Example | :SOUR:RAD:ARB:DEL "testwaveform.bin" |
| Notes | <p><string> - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

| | |
|-----------------------|--|
| Key Path | Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory |
| Remote Command | :SOURce:RADio:ARB:DELeTe:ALL |
| Example | :SOUR:RAD:ARB:DELeTe:ALL |
| Notes | <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2585 and "Sequencer" on page 2586 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> |
| Initial S/W Revision | A.05.00 |

Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 2611](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform |
| Initial S/W Revision | Prior to A.09.00 |

Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 2611](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 2612](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Change Directory ...

This key functions the same as ["Change Directory..." on page 2613](#).

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Default Directory ...

This key functions the same as ["Default Directory..." on page 2613](#)

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive |
| Initial S/W Revision | Prior to A.09.00 |

Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 2613](#).

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete Segment From ARB Memory

This key functions the same as "Delete Segment From ARB Mem" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 2614.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory |
| Initial S/W Revision | Prior to A.09.00 |

Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

| | |
|----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNT CONTInuous CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE? |
| Notes | SCPI is supported after A.09.40 |
| Notes | If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query Error! Reference source not found. Source Sweeping Condition Message to find out if the current list sequence is complete or not. |
| Range | Time Play Count Continuous Continuous Abort |
| Initial S/W Revision | A.05.00 |

Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE TIME |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

| | |
|-----------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration, Time |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT? |
| Example | :SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO? |
| Notes | SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #" |
| Notes | If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not. |
| Preset | 1.00 ms |
| Min | 100 µs |
| Max | 1800 s |
| Initial S/W Revision | A.05.00 |

Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

| | |
|-----------------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE COUN |
| Notes | SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform. |
| Initial S/W Revision | A.05.00 |

Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

| | |
|-----------------------------|---|
| Key Path | Source, Modulation Setup, ARB |
| Dependencies | This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out. |
| Initial S/W Revision | A.05.00 |

Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

| | |
|-----------------------------|--|
| Key Path | Source, List Sequencer, List Sequencer Setup, Step Duration |
| Example | :SOUR:LIST:STEP2:SET:DUR:TYPE CONT |
| Notes | SCPI is supported after A.09.40 |
| Initial S/W Revision | A.05.00 |

Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select "On", trigger event will occur on both Internal and External2 paths. Select "Off" will turn off trigger output.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer, List Sequencer Setup |
| Remote Command | :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger |
| Example | :SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG? |
| Notes | SCPI is supported after A.09.40 |
| Preset | Off |

| | |
|----------------------|---------|
| Range | On Off |
| Initial S/W Revision | A.05.00 |

Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTinuous, <time>, ON OFF 1 0, [<int>], :SOURce:LIST:STEP[1] 2 ... 4..1000:SETup?</pre> |
| Example | :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM_Test1.bin", TIME, 10ms, OFF, 255 |
| Notes | <p>The parameters are:</p> <p>(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> 1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see "Step Trigger" on page 2588. 2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590. 3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591. 4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607. 5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608. 6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609. 7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The |

options for specifying these are:

<filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

CONT - continues playback of the ARB file from the previous step

CW - outputs a CW tone

OFF - disable RF output

8. Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "[Step Duration](#)" on page 2616.

9. Time or Count <time/int> - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "[Time](#)" on page 2616 and "[Play Count](#)" on page 2617.

10. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see "[Output Trigger](#)" on page 2618.

| | |
|----------------------|--|
| Dependencies | The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. If you attempt to remotely set or query a subopcode that is out of range, an error is generated. |
| Initial S/W Revision | A.05.00 |

Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Step Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger? |
| Example | :SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see " Step Trigger " on page 2588. If input parameter number exceeds the step number defined by " Number of Steps " on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | IMMEDIATE INTERNAL KEY BUS EXTERNAL2 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:TRANsition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANsition:TIME? |
| Example | :SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms :SOUR:LIST:SET:TRAN:TIME? |
| Notes | The command is to setup below parameter array of whole list sequence. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 2590 If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|---|---|
| R e m o t e C o m m a n d | :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND? |
| E x a m p l | :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM :SOUR:LIST:SET:RAD:BAND? |

| | |
|---|--|
| e | |
| N | The command is to setup below parameter array of whole list sequence. |
| O | Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 2591 . |
| T | If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then |
| E | generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| S | |
| R | NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI |
| E | V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO |
| M | REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 |
| O | BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1 |
| T | 9 BAND20 BAND21 BAND24 BAND25 BAND26 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAN |
| E | D41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF |
| C | |
| O | |
| M | |
| M | |
| A | |
| N | |
| D | |
| N | |
| O | |
| T | |
| E | |
| S | |
| D | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on |
| E | page 2587 . |
| P | |
| E | |
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Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK? |
| Example | :SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK? |
| Notes | The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see "Radio Band Link" on page 2607 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. |
| Remote Command Notes | DOWN UP |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRrequency? |
| Example | :SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR? |

| | |
|----------------------|---|
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see "Channel" on page 2608 and "Frequency" on page 2608</p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?</pre> |
| Example | <pre>:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?</pre> |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see "Power" on page 2609.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p> |
| Dependencies | <p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587.</p> |
| Initial S/W Revision | A.09.40 |

Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | <pre>:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ...</pre> |
|-----------------------|--|

| | |
|-----------------------------|---|
| | :SOURce:LIST:SETup:WAVeform? |
| Example | :SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Waveform <string> - specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:</p> <p><filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</p> <p>CONT - continues playback of the ARB file from the previous step</p> <p>CW - outputs a CW tone</p> <p>OFF - disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Range | "filename" "CW" "Off" "CONT" |
| Initial S/W Revision | A.09.40 |

Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 2587 Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------------|---|
| Remote Command | :SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:DURation:TYPE? |
| Example | :SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE? |
| Notes | <p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <enum> - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 2616.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p> |
| Remote Command Notes | TIME COUNT CONTinuous |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details |

| | |
|----------------------|--|
| | see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ... :SOURce:LIST:SETup:TOCount? |
| Example | :SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC? |
| Notes | The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "Time" on page 2616 and "Play Count" on page 2617 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current "Step Duration" on page 2616 is “Continuous”, then generate error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #" |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 2587 . |
| Initial S/W Revision | A.09.40 |

Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 2587](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

| | |
|-----------------------|--|
| Remote Command | :SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ? |
| Example | :SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG? |
| Notes | The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see "Output Trigger" on page 2618 . If input parameter number exceeds the step number defined by "Number of Steps" on page 2587 Number of Steps then generate error ", and only those parametes whose index number falls in |

| | |
|----------------------|--|
| | legal step number will be updated. |
| Remote Command Notes | ON OFF 1 0 |
| Dependencies | The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " Number of Steps " on page 2587. |
| Initial S/W Revision | A.09.40 |

Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

| | |
|-----------------------|--------------------------|
| Remote Command | :SOURce:LIST:SETup:CLEar |
| Example | :SOUR:LIST:SETup:CLE |
| Initial S/W Revision | A.05.00 |

Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

| | |
|-----------------------|---|
| Key Path | Source, List Sequencer |
| Remote Command | :SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker |
| Example | :SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP? |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPe STEP MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPe STEP MARKer |
| Preset | BEGinningofstep |
| Range | BEGinningofstep DATamarker |
| Initial S/W Revision | A.14.00 |

BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP BEG |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPe STEP Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPe STEP |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

| | |
|-----------------|---|
| Key Path | Source, List Sequencer, Trigger Type |
| Example | :SOUR:LIST:TRIG:TYP DAT |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE MARKer Recommend to use : SOURce:LIST:TRIGger:OUTPut:TYPE MARKer |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M1 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M1 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

| | |
|-----------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M2 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M2 |

| | |
|----------------------|---------|
| Initial S/W Revision | A.14.00 |
|----------------------|---------|

Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M3 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M3 |
| Initial S/W Revision | A.14.00 |

Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

| | |
|----------------------|--|
| Key Path | Source, List Sequencer, Trigger Type, DataMarker |
| Example | :SOUR:LIST:TRIG:TYPE:MARK M4 |
| Notes | SCPI is supported after A.14.00 This an alias SCPI of :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 Recommend to use :SOURce:LIST:TRIGger:OUTPut:TYPE:MARKer M4 |
| Initial S/W Revision | A.14.00 |

Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

| | |
|-----------------------|--------------------------------------|
| Key Path | Source, List Sequencer |
| Remote Command | No remote command, front panel only. |
| Initial S/W Revision | A.05.00 |

Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

| | |
|-----------------------|---|
| Remote Command | :SOURce:LIST:TRIGger:INITiate[:IMMediate] |
| Example | :SOUR:LIST:TRIG:INIT |
| Initial S/W Revision | A.05.00 |

Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

| | |
|-----------------------------|--|
| Remote Command | :SOURce:LIST:INITiation:ARMed? |
| Example | :SOUR:LIST:INIT:ARMed? |
| Notes | The return data is in the following format: Integer |
| Notes | Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see "Initiate Sequence" on page 2586 Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately. |
| Notes | There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?". |
| Initial S/W Revision | A.09.40 |

Source Preset

Allows you to preset the source settings to their default values.

| | |
|-----------------------|----------------|
| Key Path | Source |
| Remote Command | :SOURce:PRESet |
| Example | :SOUR:PRES |

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Ref Value

Sets the reference value for time on the horizontal axis. When Auto Scaling is set to On, the displayed plots use a Scale/Div value determined by the analyzer, based on the measurement result.

| | |
|--------------------------|--|
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:RLEVel? |
| Example | DISP:WAV:VIEW:WIND:TRAC:X:RLEV 10 ms DISP:WAV:VIEW:WIND:TRAC:X:RLEV? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. |
| Preset | 0.00 s |
| State Saved | Saved in instrument state. |
| Min | -1.000 s |
| Max | 10.00 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Scale/Div

Sets the horizontal scale by changing a time value per division.

| | |
|-----------------------|--|
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:PDIVision? |
| Example | DISP:WAV:VIEW:WIND:TRAC:X:PDIV 500 us DISP:WAV:VIEW:WIND:TRAC:X:PDIV? |

| | |
|--------------------------|--|
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off. |
| Preset | All except the following list: 200.0 us LTEAFDD, LTEATDD: 1.000 ms LTETDD: 1.000 ms LTE: 1.000 ms |
| State Saved | Saved in instrument state. |
| Min | 1.000 ns |
| Max | 320 s |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00, A.14.00 |

Ref Position

Sets the reference position for the X axis to Left, Center or Right.

| | |
|--------------------------|--|
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALE]:RPOSition LEFT CENTer RIGHT :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALE]:RPOSition? |
| Example | DISP:WAV:VIEW:WIND:TRAC:X:RPOS LEFT DISP:WAV:VIEW:WIND:TRAC:X:RPOS? |
| Notes | Allows you to set the reference position to Left, Ctr (center) or Right. You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | LEFT |
| State Saved | Saved in instrument state. |
| Range | Left Ctr Right |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Auto Scaling

Toggles the scale coupling function between On and Off.

| | |
|---------------------------------|--|
| Key Path | SPAN X Scale |
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTE_TDD, DCATV, WLAN, MSR, LTE_TDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 1 OFF ON :DISPlay:WAVeform:VIEW[1] 2:WINDow[1]:TRACe:X[:SCALe]:COUPle? |
| Example | DISP:WAV:VIEW:WIND:TRAC:X:COUP ON DISP:WAV:VIEW:WIND:TRAC:X:COUP? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Couplings | When Auto Scaling is On and the Restart front-panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. |
| Preset | 1 |
| State Saved | Saved in instrument state. |
| Range | On Off |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:PAUSE |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

| | |
|-----------------------|--|
| Key Path | Sweep/Control |
| Remote Command | :INITiate:RESume |
| Dependencies | Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing. |
| Initial S/W Revision | Prior to A.02.00 |

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

| | |
|-----------------------|--------|
| Remote Command | :ABORT |
| Example | :ABOR |

| | |
|------------------------------|--|
| Notes | <p>If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met.</p> <p>If :INITiate:CONTinuous is OFF, then :INITiate:IMMEDIATE is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.</p> |
| Dependencies | <p>For continuous measurement, ABORt is equivalent to the Restart key.</p> <p>Not all measurements support the abort command.</p> |
| Status Bits/OPC dependencies | <p>The STATus:OPERation register bits 0 through 8 are cleared.</p> <p>The STATus:QUEStionable register bit 9 (INTEgrity sum) is cleared.</p> <p>Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.</p> |
| Initial S/W Revision | <p>Prior to A.02.00</p> |

15 Waveform Measurement
System

System

See ["System" on page 278](#)

Trace/Detector

There is no Trace/Detector functionality supported in the Waveform measurement. The front-panel key displays a blank menu when pressed.

| Key Path | Front-panel key |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |

Trigger

See ["Trigger" on page 334](#)

Free Run

See ["Free Run " on page 341](#)

Video

See ["Video \(IF Envelope\) " on page 1249](#)

Trigger Level

See ["Trigger Level " on page 1250](#)

Trig Slope

See ["Trig Slope " on page 1251](#)

Trig Delay

See ["Trig Delay " on page 344](#)

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

Trig Delay

See ["Trig Delay " on page 347](#)

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 1253](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

Trig Delay

See ["Trig Delay "](#) on page 350

Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off"](#) on page 1255

RF Burst

See ["RF Burst "](#) on page 1267

Absolute Trigger

See ["Absolute Trigger Level"](#) on page 1268

Relative Trigger

See ["Relative Trigger Level"](#) on page 1257

Trig Slope

See ["Trigger Slope "](#) on page 1269

Trig Delay

See ["Trig Delay "](#) on page 354

Periodic Timer

See ["Periodic Timer \(Frame Trigger\) "](#) on page 1259

Period

See ["Period "](#) on page 1260

Offset

See ["Offset "](#) on page 1261

Offset Adjust (Remote Command Only)

See ["Offset Adjust \(Remote Command Only\)"](#) on page 1262

Reset Offset Display

See ["Reset Offset Display "](#) on page 1263

Sync Source

See ["Sync Source "](#) on page 1263

Off

See ["Off "](#) on page 1264

External 1

See ["External 1 " on page 1264](#)

Trigger Level

See ["Trigger Level " on page 1264](#)

Trig Slope

See ["Trig Slope " on page 1265](#)

External 2

See ["External 2 " on page 1265](#)

Trigger Level

See ["Trigger Level " on page 1266](#)

Trig Slope

See ["Trig Slope " on page 1267](#)

RF Burst

See ["RF Burst " on page 1267](#)

Absolute Trigger

See ["Absolute Trigger Level" on page 1268](#)

Trig Slope

See ["Trigger Slope " on page 1269](#)

Trig Delay

See ["Trig Delay" on page 365](#)

Auto/Holdoff

See ["Auto/Holdoff " on page 1270](#)

Auto Trig

See ["Auto Trig " on page 1270](#)

Trig Holdoff

See ["Trig Holdoff " on page 1271](#)

Holdoff Type

See ["Holdoff Type" on page 367](#)

User Preset

Accesses a menu that gives you the following three choices:

- **User Preset** – recalls a state previously saved using the Save User Preset function.
- **User Preset All Modes** – presets all of the modes in the analyzer
- **Save User Preset**– saves the current state for the current mode

| Key Path | Front-panel key |
|-------------------------------|--|
| Backwards Compatibility Notes | <p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p> |
| Initial S/W Revision | Prior to A.02.00 |

User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER |
| Notes | :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed |
| Couplings | A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |
| Initial S/W Revision | Prior to A.02.00 |

User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

| | |
|-----------------------|--|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:ALL |
| Example | :SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL |
| Notes | Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state. |
| Couplings | A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved. |

| | |
|----------------------|------------------|
| Initial S/W Revision | Prior to A.02.00 |
|----------------------|------------------|

Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

| | |
|-----------------------|---|
| Key Path | User Preset |
| Remote Command | :SYSTem:PRESet:USER:SAVE |
| Example | :SYST:PRES:USER:SAVE |
| Notes | :SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file. |
| Initial S/W Revision | Prior to A.02.00 |

View/Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement.

This topic contains the following sections:

["View Selection by name \(Remote Command Only\)" on page 2644](#)

["View Selection by number \(Remote Command Only\)" on page 2644](#)

View Selection by name (Remote Command Only)

Selects the results view.

| Key Path | View/Display |
|--------------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW[:SElect] RFENvelope IQ :DISPlay:WAVeform:VIEW[:SElect]? |
| Example | DISP:WAV:VIEW RFEN DISP:WAV:VIEW? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | RFENvelope |
| State Saved | Saved in instrument state. |
| Range | RF Envelope Q Waveform |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

View Selection by number (Remote Command Only)

Displays the numeric values of the measurement results.

| | |
|-----------------------|---|
| Mode | BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVD0, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, WLAN, MSR,LTEATDD, LTEAFDD |
| Remote Command | :DISPlay:WAVeform:VIEW:NSElect <integer> :DISPlay:WAVeform:VIEW:NSElect? |
| Example | DISP:WAV:VIEW:NSEL 1 DISP:WAV:VIEW:NSEL? |
| Notes | You must be in a mode that includes the Waveform measurement to use this command. Use INSTRument:SElect to set the mode. |
| Preset | 1 |
| State Saved | Saved in instrument state. |

| | |
|--------------------------|------------------|
| Min | 1 |
| Max | 2 |
| Initial S/W Revision | Prior to A.02.00 |
| Modified at S/W Revision | A.03.00 |

| | |
|----------------------|------------------------|
| Key Path | Front-panel key |
| Initial S/W Revision | Prior to A.02.00 |

Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

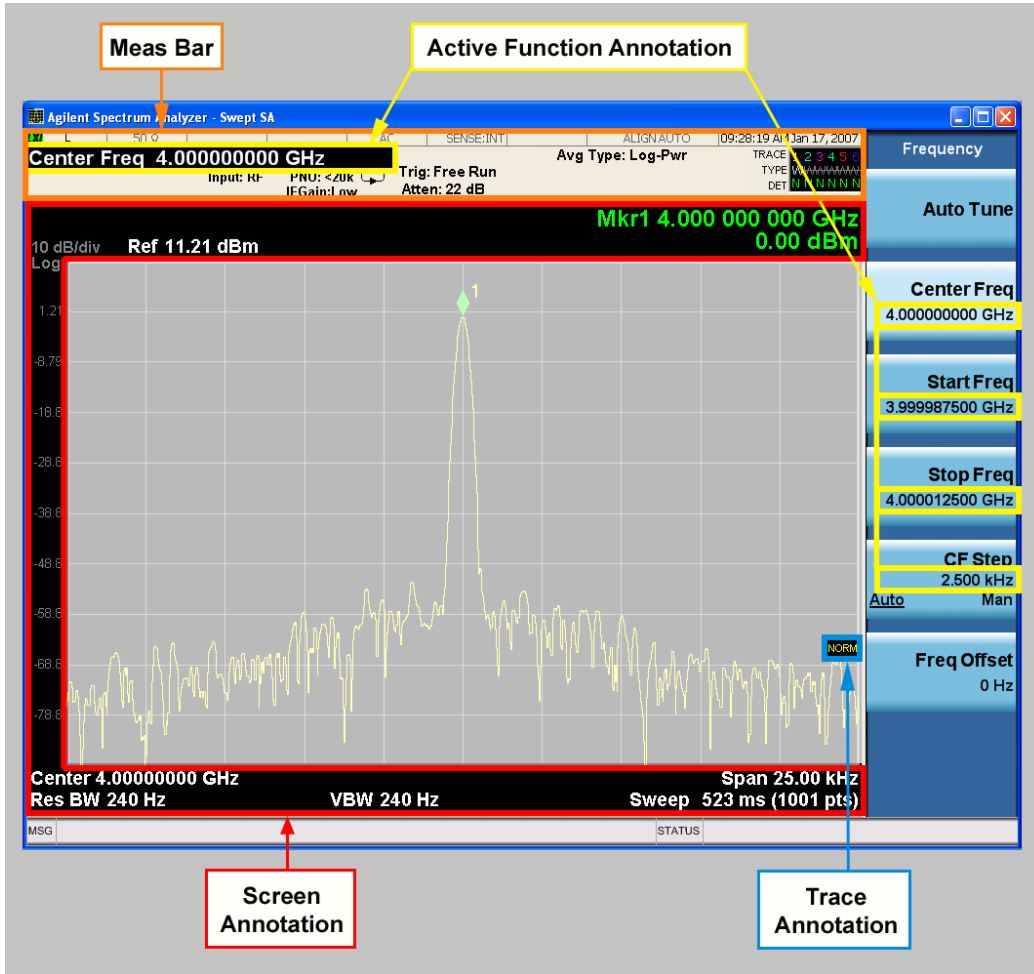
| | |
|----------------------|---------------------|
| Key Path | Display |
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

| | |
|----------------|---|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]? |
| Example | DISP:ANN:MBAR OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off. |

| | |
|----------------------|----------------------------|
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

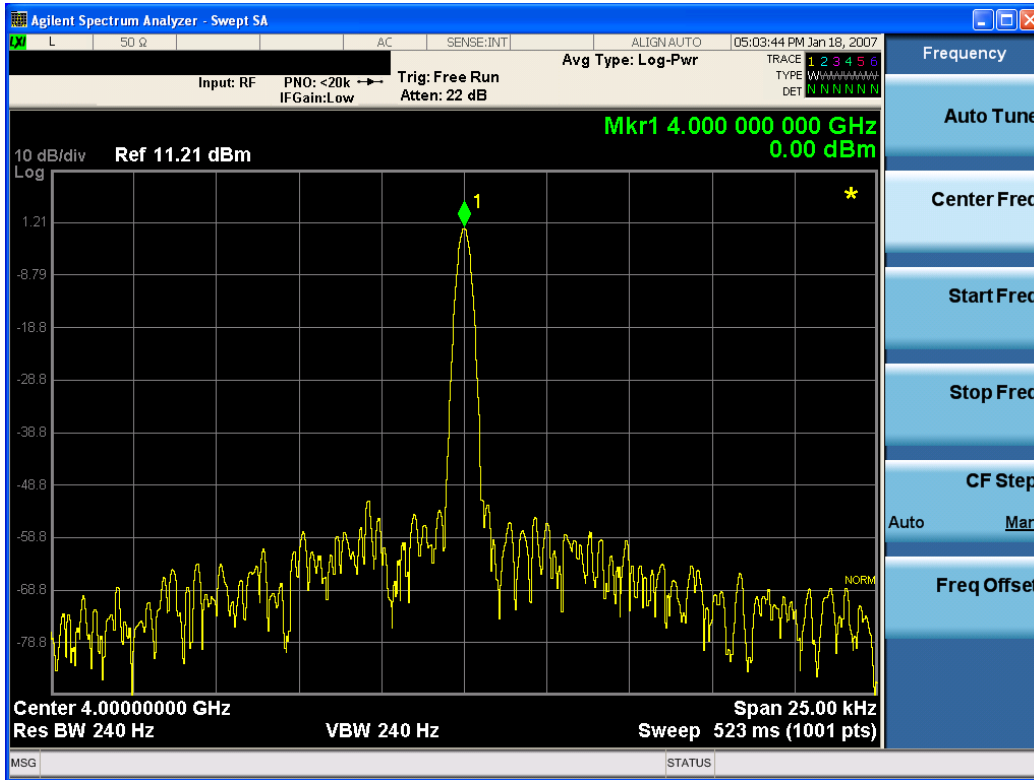
| Key Path | View/Display, Display, Annotation |
|-----------------------|--|
| Remote Command | :DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]? |
| Example | DISP:ANN:SCR OFF |
| Dependencies | Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..

15 Waveform Measurement
View/Display



| | |
|----------------------|--|
| Key Path | View/Display, Display, Annotation |
| Remote Command | :DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE] ? |
| Example | DISP:ACT OFF |
| Dependencies | Grayed out and forced to OFF when System Display Settings, Annotation is set to Off. |
| Preset | On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Title

Displays menu keys that enable you to change or clear a title on your display.

| | |
|----------------------|-----------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

NOTE

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

| | |
|----------------------|---|
| Key Path | View/Display, Display, Title |
| Mode | All |
| Remote Command | :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA? |
| Example | DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title |
| Notes | Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters. |
| Preset | No title (measurement name instead) |
| State Saved | Saved in instrument state. |
| Initial S/W Revision | Prior to A.02.00 |

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

| | |
|----------|---|
| Key Path | View/Display, Display, Title |
| Example | The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required. |
| Notes | Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted). |

| | |
|----------------------|----------------------|
| Preset | Performed on Preset. |
| Initial S/W Revision | Prior to A.02.00 |

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

| | |
|----------------------|--|
| Key Path | View/Display, Display |
| Remote Command | :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]? |
| Example | DISP:WIND:TRAC:GRAT:GRID OFF |
| Notes | The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis. |
| Preset | On |
| State Saved | Saved in instrument state |
| Initial S/W Revision | Prior to A.02.00 |

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

| | |
|----------------------|------------------------------|
| Key Path | View/Display, Display |
| Initial S/W Revision | Prior to A.02.00 |

Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **ScreenAnnotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

| | |
|----------------|--|
| Key Path | View/Display, Display, System Display Settings |
| Remote Command | :DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]? |
| Example | :DISP:WIND:ANN OFF |

| | |
|-------------------------------|---|
| Preset | On (Set by Restore Misc Defaults) |
| State Saved | Not saved in instrument state. |
| Backwards Compatibility Notes | The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected. |
| Initial S/W Revision | Prior to A.02.00 |

Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

| | |
|-------------------------------|---|
| Key Path | Save, Screen Image |
| Remote Command | :MMEMory:STORe:SCReen:THEMe TDColor TDMonochrome FCoLor FMONochrome :MMEMory:STORe:SCReen:THEMe? |
| Example | :MMEM:STOR:SCR:THEM TDM |
| Preset | 3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes. |
| Readback | 3D Color 3D Mono Flat Color Flat Mono |
| Backwards Compatibility Notes | In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical. |
| Initial S/W Revision | Prior to A.02.00 |

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDC |
| Readback | 3D Color |
| Initial S/W Revision | Prior to A.02.00 |

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM TDM |
| Readback | 3D Mono |
| Initial S/W Revision | Prior to A.02.00 |

Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FCOL |
| Readback | Flat Color |
| Initial S/W Revision | Prior to A.02.00 |

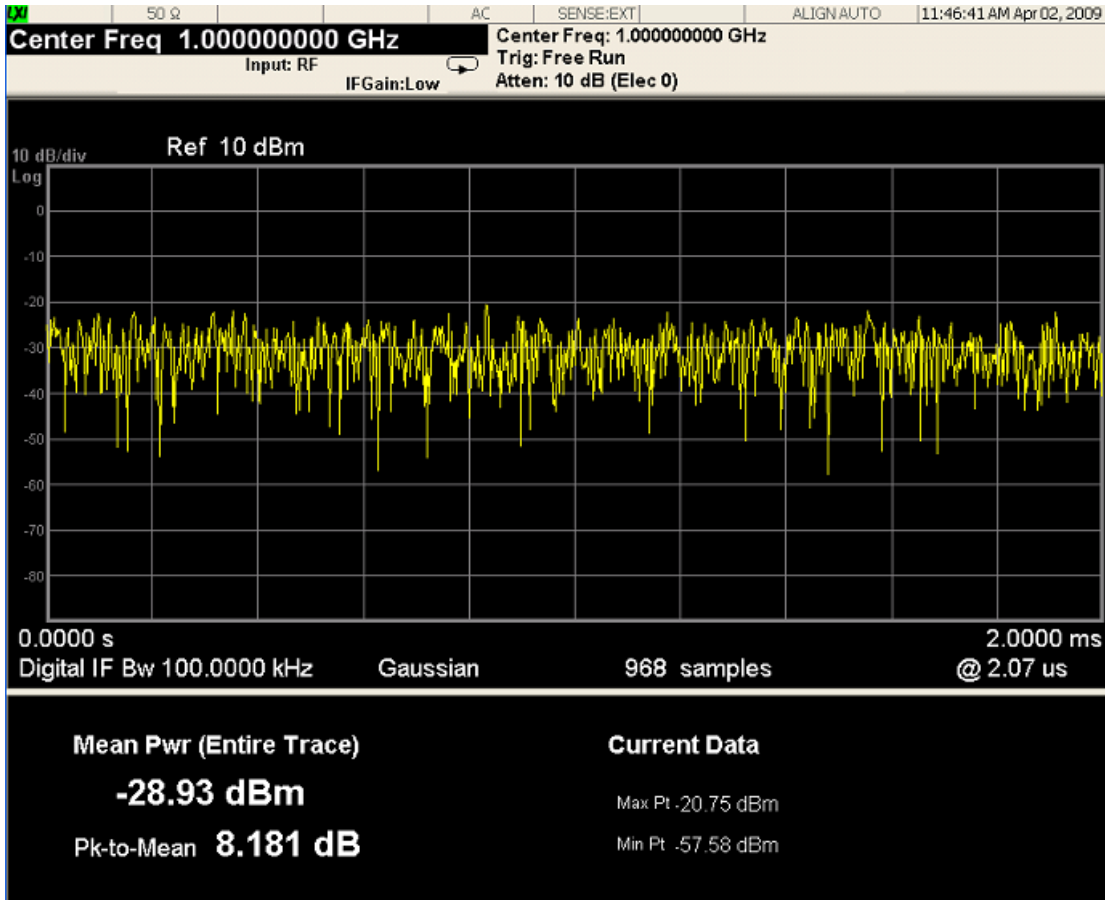
Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

| | |
|----------------------|-----------------------------------|
| Key Path | Save, Screen Image, Themes |
| Example | MMEM:STOR:SCR:THEM FMON |
| Readback | Flat Mono |
| Initial S/W Revision | Prior to A.02.00 |

RF Envelope

This view shows an example of the RF Envelope result for the waveform (time domain) measurements in the graph window. The measured values for the mean power and peak-to-mean power are shown in the text window.



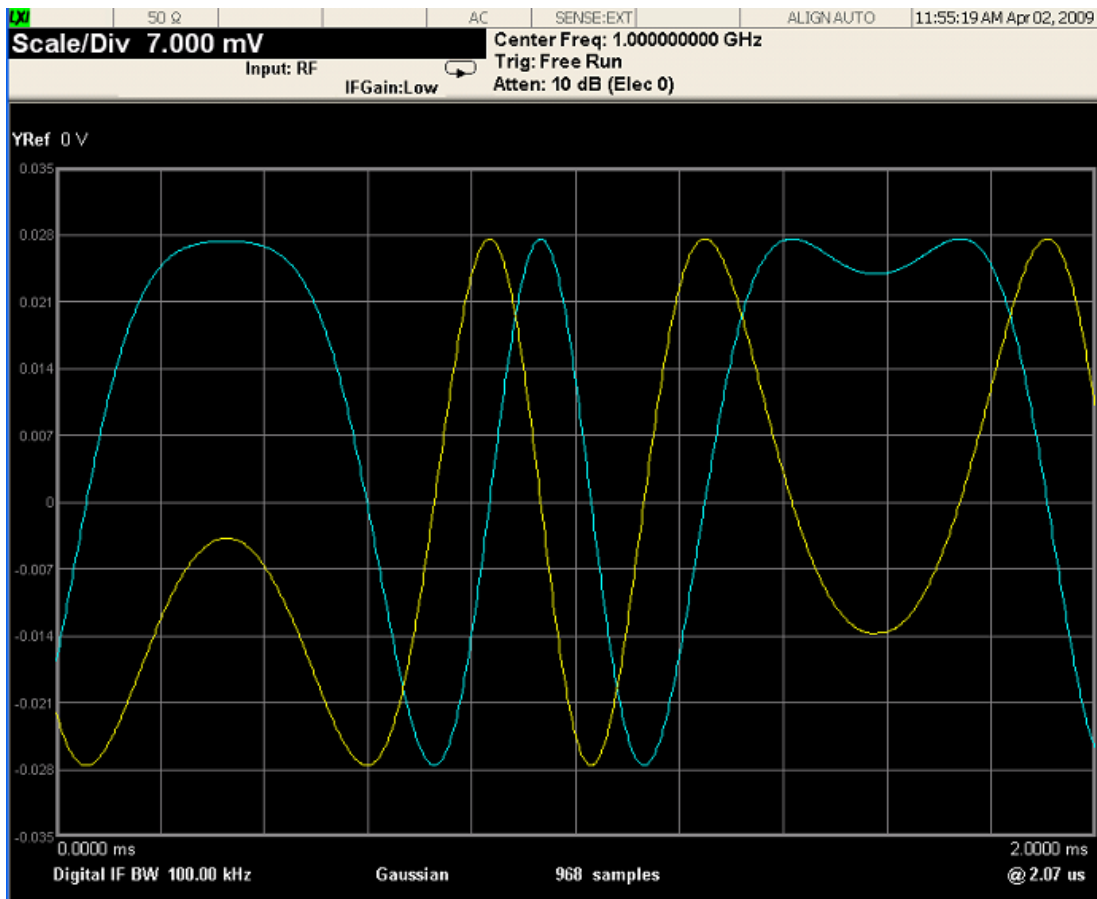
Numeric Results

| Name | Type | Description | Unit | Format |
|------------|---------|--|------|-----------|
| Mean Pwr | Float64 | The mean power (dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled. | dBm | XX.XX dBm |
| Pk-to-Mean | Float64 | This is the ratio of the maximum signal level to the mean power. | dB | XX.XX dB |
| Max Pt | Float64 | The maximum of the most recently acquired data. | dBm | XX.XX dBm |
| Min Pt | Float64 | The minimum of the most recently acquired data. | dBm | XX.XX dBm |

| | |
|----------------------|---------------------|
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |

I/Q Waveform

This view shows the I and Q signal waveforms in parameters of voltage versus time.



| | |
|----------------------|------------------|
| Key Path | View/Display |
| Initial S/W Revision | Prior to A.02.00 |



This information is subject to change without notice.

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