Keysight M9420A
VXT Vector Transceiver

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KEYSIGHT TECHNOLOGIES

N9076A 1xEV-DO Measurement Application User's and Programmer's Reference

Notices

Trademark Acknowledgments

Manual Part Number

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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Table of Contents

1 About the Transceiver

The M9420A VXT Vector Transceiver measures and monitors complex RF and microwave signals. The transceiver integrates traditional measurements with advanced vector signal analysis to optimize speed, accuracy, and dynamic range.

With a broad set of applications and demodulation capabilities, an intuitive virtual user interface, outstanding connectivity and powerful measurements, the transceiver is ideal for both R&D and manufacturing engineers working on cellular, emerging wireless communications, general purpose, aerospace and defense applications.

Installing Application Software

If you want to install a measurement application after your initial hardware purchase, you need only to license it. 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 Signal Transceiver.

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** in virtual panel to display the measurement applications that are currently licensed in your transceiver.

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

C:\Program Files\Keysight\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 virtual front panel keys at **System**, **Licensing. . .** , or on-disk at:

C:\Programming Files\Keysight\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** in virtual panel.)

Check the appropriate page of the Keysight web site for the latest available software versions as follows:

http://www.keysight.com/find/m9420a

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

M9420A 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/m9420a

2. The home page for Keysight M9420A VXT Vector Transceiver 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. Click the Options tab, to display a list of available options and accessories for your instrument.

Virtual Front-Panel Features

The instrument's Virtual Front-panel features are fully detailed in the section "Virtual Front-Panel Features" of the M9420A Getting Started Guide.

Display Annotations

Display Annotations are fully detailed under the Section "Display Annotations" of the M9420A Getting Started Guide.

Window Control Keys

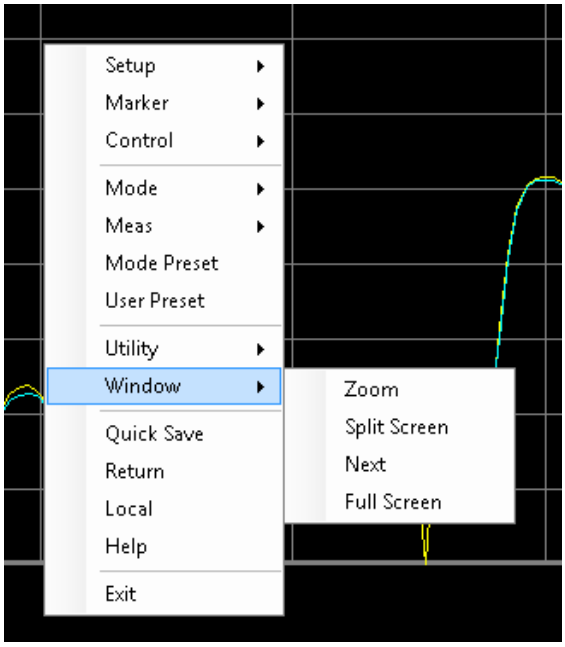
The instrument provides three virtual-front-panel keys or four menu items for controlling windows.

Virtual Front Panel

The virtual-front-panel keys are Multi Window, Zoom, and Next Window. These are all “immediate action” keys.

Windows Control Menu

The menu items are Zoom, Split Screen, Next [Window], and Full screen. These are all “immediate action” menu selections. Zoom and Full Screen are toggle functions.



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.

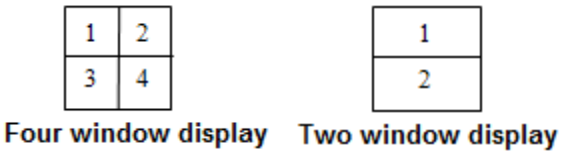
NOTE Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

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 precedencebecomes 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.):



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.**

Full Screen

When Full Screen is pressed the measurement window expands horizontally over the entire instrument display. The screen graticule area expands to fill the available display area.

It turns off the display of the softkey labels, however the menus and active functions still work. (Though it would obviously be very hard to navigate without the key labels displayed.) Pressing Full Screen again while Full Screen is in effect cancels Full Screen.

Note that the banner and status lines are unaffected. You can get even more screen area for your data display by turning off the Meas Bar (in the Display menu) which also turns off the settings panel.

Full Screen is a Meas Global function. Therefore it is cancelled by the Preset key.

Key Path	Display
Remote Command	`:DISPlay:FSCReen[:STATe] OFF|ON|0|1` `:DISPlay:FSCReen[:STATe]?`
Preset	Unaffected by Preset but set to Off by Restore Misc Defaults or shutdown and restart
State Saved	Not saved in instrument state.
Backwards Compatibility SCPI	`:DISPlay:MENU[:STATe] OFF|ON|0|1` This emulates ESA full screen functionality, which is the same as the FSCReen command in PSA except that the sense of on/off is reversed (that is, OFF means the menus are OFF, so Fullscreen is ON) and the default is ON (meaning Fullscreen is OFF).
Backwards Compatibility Notes	In ESA/PSA, Full Screen was turned on with a softkey, so pressing any other key turned Full Screen off. In the X-Series, because a hardkey is provided to turn this function on and off, pressing any other key no longer turns off Full Screen
Initial S/W Revision	Prior to A.02.00

Display Enable (Remote Command Only)

Turns the display on/off, including the display drive circuitry. The backlight stays lit so you can tell that the instrument is on. The display enable setting is mode global. The reasons for turning the display off are three:

- To increase speed as much as possible by freeing the instrument from having to update the display
- To reduce emissions from the display, drive circuitry
- For security purposes

If you have turned off the display:

- and you are in local operation, the display can be turned back on by pressing any key or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)
- and you are in remote operation, the display can be turned back on by pressing the Local or Esc keys or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)

and you are using either the SYSTem:KLOCk command or GPIB local lockout, then no front-panel key press will turn the display back on. You must turn it back on remotely.

Remote Command	`:DISPlay:ENABle OFF|ON|0|1` `:DISPlay:ENABle?`
Example	DISP:ENAB OFF
Couplings	DISP:ENAB OFF turns Backlight OFF and DISP:ENAB ON turns Backlight ON. However, settings of Backlight do not change the state of DISP:ENAB
Preset	On Set by SYST:DEF MISC, but Not affected by *RST or SYSTem:PRESet.

State Saved	Not saved in instrument state.
Backwards Compatibility Notes	SYST:PRES no longer turns on DISPlay:ENABle as it did in legacy analyzers
Initial S/W Revision	Prior to A.02.00

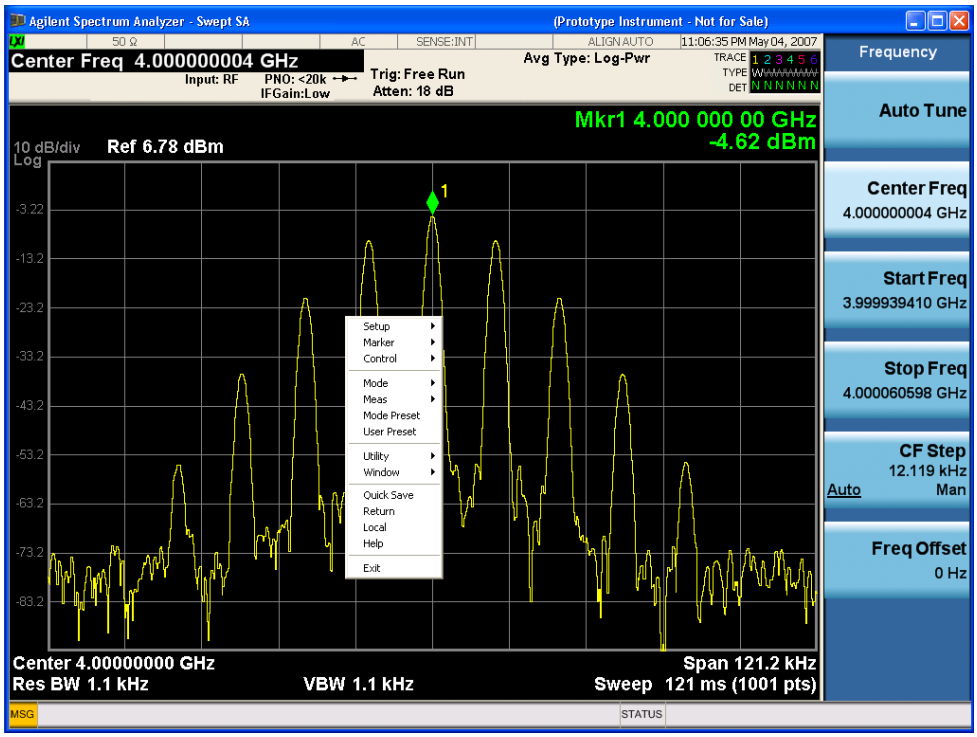
Mouse and Keyboard Control

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.

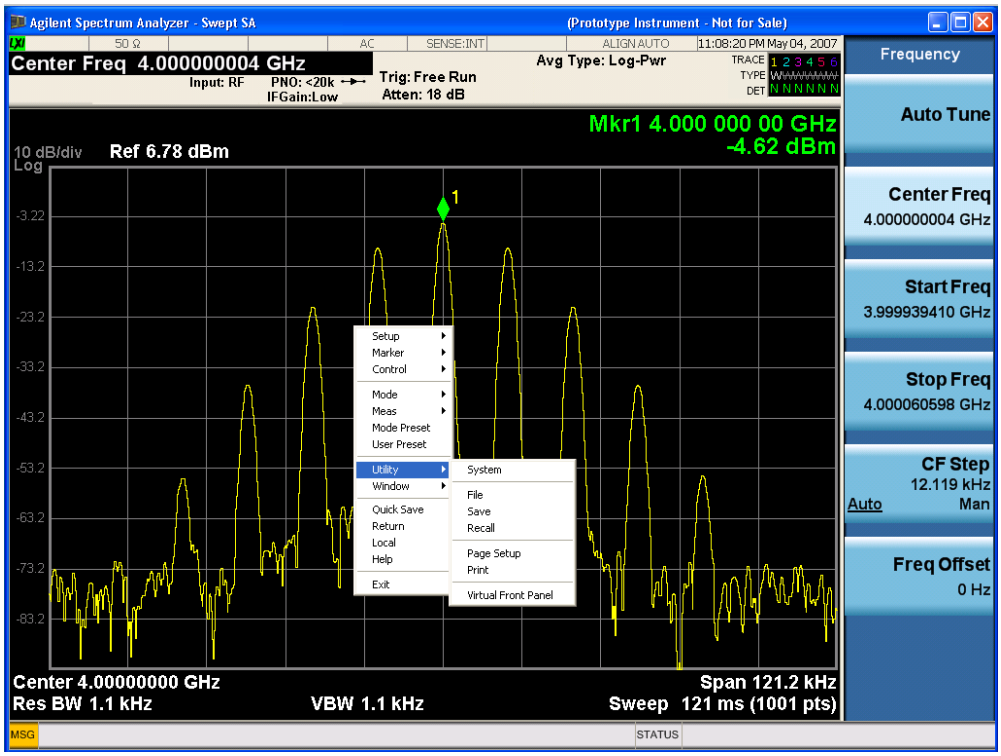
For instrument lacking a physical front panel display, you can watch the instrument display via external monitor or remote desktop connection

Right-Click

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

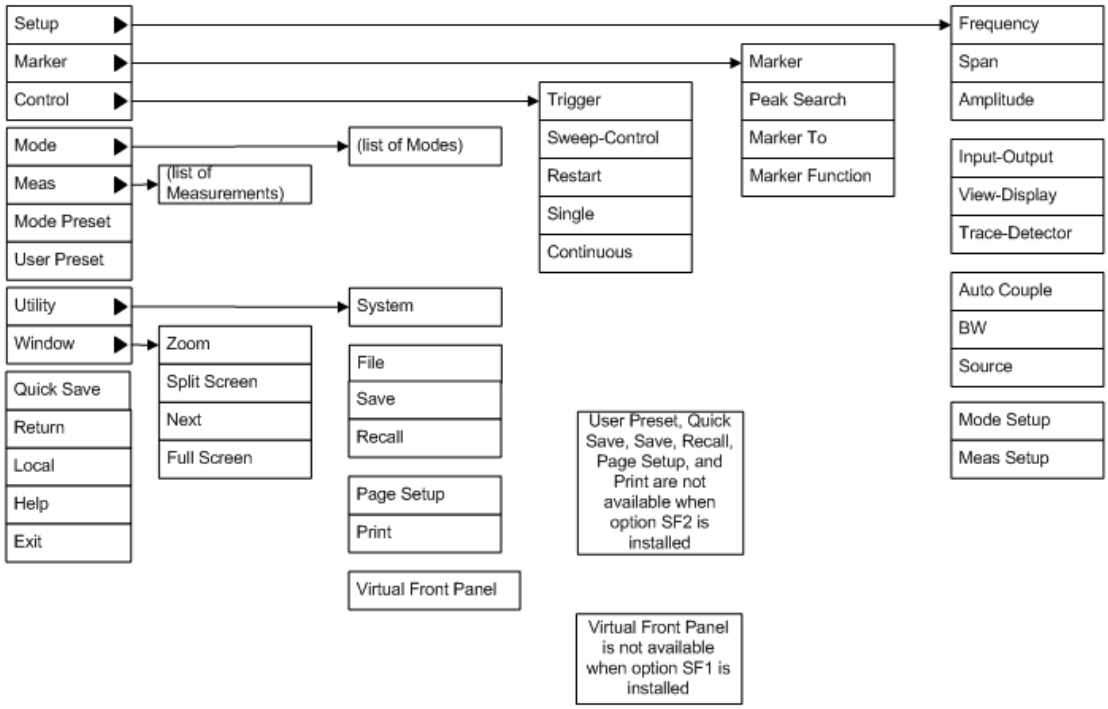


Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



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:



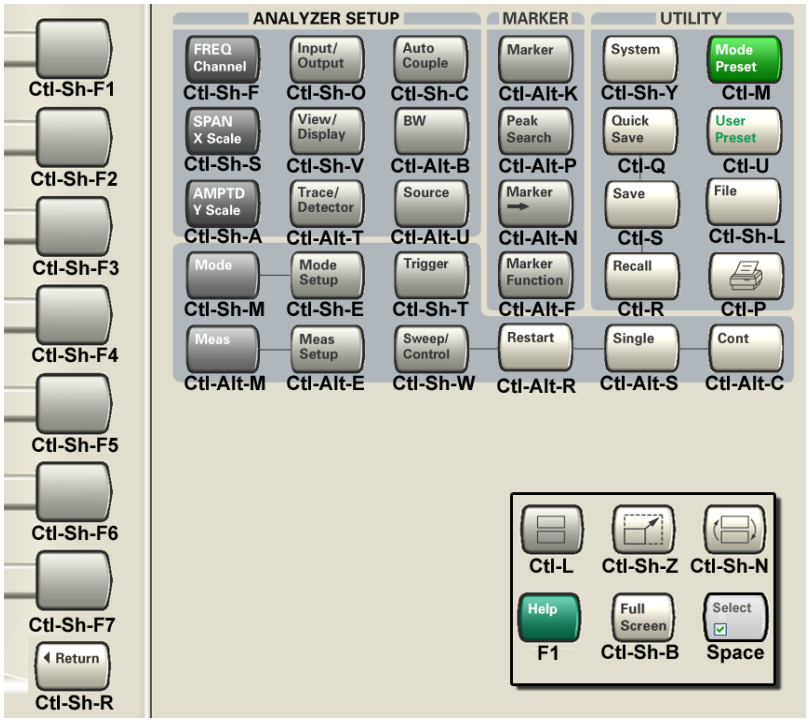
PC Keyboard

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
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

Front-panel key	Key code
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
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:



2 About the 1xEV-DO Measurement Application

This chapter provides overall information on 1xEV-DO communications systems, and describes 1xEV-DO measurements made by the transceiver.

What Does the 1xEV-DO Application Do?

This analyzer can be used for testing a 1xEV-DO transmitter, manufactured according to the following standard document:

- 3GPP2 C.S0024-B cdma2000 High Rate Packet Data Air Interface Specification

These documents define complex, multi-part measurements used to create and maintain an interference-free environment. For example, the documents include standardized test methods for the measurement of power in a carrier, a spectrum emission mask, and other critical measurements.

The instrument automatically makes these measurements using the measurement methods and limits defined in the documents. The detailed results displayed by the measurements enable you to analyze 1xEV-DO system performance. You may alter the measurement parameters for specialized analysis. For infrastructure test, the analyzer will test transmitters of base stations in a non-interfering manner using a coupler or power splitter.

This analyzer makes the following measurements of 1xEV-DO signals:

- Channel Power
- Adjacent Channel Power (ACP or ACLR)
- Spectrum Emission Mask
- Occupied BW
- Reverse Link Code Domain
- Reverse Link Modulation Accuracy (Waveform Quality)

3 Programming the Transceiver

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

What Programming Information is Available?

The M9420A Documentation can be accessed through the Additional Documentation page in the instrument Help system and is included on the Documentation DVD shipped with the instrument. It can also be found online at: http://www.keysight.com/find/m9420a_manuals.

The following resources are available to help you create programs for automating your unit:

Resource	Description
M9420A Programmer's Guide	Provides general SCPI programming information on the following topics: • Programming the X-Series Applications • Programming fundamentals • Programming with IVI driver Note that SCPI command descriptions for measurement applications are not in this book, but are in the User's and Programmer's Reference.
User's and Programmer's Reference manuals	Describes all virtual front panel keys, including SCPI commands for a measurement application. Note that: • Each measurement application has its own User's and Programmer's Reference. • The content in this manual is duplicated in the instrument's Help (the Help that you see for a key is identical to what you see in this manual).
Embedded Help in your instrument	Describes all virtual 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.
M9420A Getting Started Guide	Provides valuable sections related to programming including: • Licensing New Measurement Application Software - After Initial Purchase • Using the controller to connect to the transceiver This printed document is shipped with the instrument.

List of SCPI Commands

*

*CLS
*ESE
*ESE?
*ESR?
*IDN?
*OPC
*OPC?
*OPT?
*RCL
*RST
*SAV
*SRE
*SRE?
*STB?
*TRG
*TST?
*WAI

A

ABORt

C

CALCulate:ACPower:LIMit:STATe
CALCulate:ACPower:LIMit:STATe?
CALCulate:ACPower:MARKer:AOFF
CALCulate:ACPower:MARKer:COUPle[:STATe]
CALCulate:ACPower:MARKer:COUPle[:STATe]?
CALCulate:ACPower:MARKer[1]|2|...|12:FUNCtion:RESult?
CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum
CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:LEFT
CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:NEXT
CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:RIGHt
CALCulate:ACPower:MARKer[1]|2|...|12:MINimum
CALCulate:ACPower:MARKer[1]|2|...|12:MODE
CALCulate:ACPower:MARKer[1]|2|...|12:MODE?
CALCulate:ACPower:MARKer[1]|2|...|12:PTPeak
CALCulate:ACPower:MARKer[1]|2|...|12:REFerence
CALCulate:ACPower:MARKer[1]|2|...|12:REFerence?
CALCulate:ACPower:MARKer[1]|2|...|12:STATe
CALCulate:ACPower:MARKer[1]|2|...|12:STATe?
CALCulate:ACPower:MARKer[1]|2|...|12:TRACe
CALCulate:ACPower:MARKer[1]|2|...|12:TRACe?

```
CALCulate:ACPower:MARKer[1]|2|...|12:X
CALCulate:ACPower:MARKer[1]|2|...|12:X?
CALCulate:ACPower:MARKer[1]|2|...|12:X:POSition
CALCulate:ACPower:MARKer[1]|2|...|12:X:POSition?
CALCulate:ACPower:MARKer[1]|2|...|12:Y?
CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:NEGative[:UPPer]:DATA
CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:NEGative[:UPPer]:DATA?
CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:POSitive[:UPPer]:DATA
CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:POSitive[:UPPer]:DATA?
CALCulate:CDPower:ASET:THReshold
CALCulate:CDPower:AXIS
CALCulate:CDPower[:BTS]:ASET:THReshold
CALCulate:CDPower[:BTS]:ASET:THReshold?
CALCulate:CDPower[:BTS]:ASET:THReshold:AUTO
CALCulate:CDPower[:BTS]:ASET:THReshold:AUTO?
CALCulate:CDPower[:BTS]:AXIS
CALCulate:CDPower[:BTS]:AXIS?
CALCulate:CDPower[:BTS]:CHANnel:TYPE
CALCulate:CDPower[:BTS]:CHANnel:TYPE?
CALCulate:CDPower[:BTS]:DBIT:FORMat
CALCulate:CDPower[:BTS]:DBIT:FORMat?
CALCulate:CDPower[:BTS]:DBITs:TSTate
CALCulate:CDPower[:BTS]:DBITs:TSTate?
CALCulate:CDPower[:BTS]:IQ:COMBined[:STATe]
CALCulate:CDPower[:BTS]:IQ:COMBined[:STATe]?
CALCulate:CDPower[:BTS]:MARKer:AOFF
CALCulate:CDPower[:BTS]:MARKer:COUPle[:STATe]
CALCulate:CDPower[:BTS]:MARKer:COUPle[:STATe]?
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MAXimum
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MAXimum:LEFT
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MAXimum:NEXT
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MAXimum:RIGHt
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MINimum
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MODE
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:MODE?
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:PTPeak
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:REFerence
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:REFerence?
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12[:SET]:DESPread
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CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:STATe?
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CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:SYMBol?
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CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:X?
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:X:POSition
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:X:POSition?
CALCulate:CDPower[:BTS]:MARKer[1]|2|...12:Y?
CALCulate:CDPower[:BTS]:PACKed
CALCulate:CDPower[:BTS]:PACKed?
CALCulate:CDPower[:BTS]:SWEep:OFFSet
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CALCulate:CDPower[:BTS]:SWEep:OFFSet?
CALCulate:CDPower[:BTS]:SWEep:TIME
CALCulate:CDPower[:BTS]:SWEep:TIME?
CALCulate:CDPower[:BTS]:TYPE
CALCulate:CDPower[:BTS]:TYPE?
CALCulate:CDPower[:BTS]:TYPE:DATA
CALCulate:CDPower[:BTS]:TYPE:DATA?
CALCulate:CDPower[:BTS]:WCODe[:NUMBer]
CALCulate:CDPower[:BTS]:WCODe[:NUMBer]?
CALCulate:CDPower[:BTS]:WCODe:ORDer
CALCulate:CDPower[:BTS]:WCODe:ORDer?
CALCulate:CDPower:CHANnel:TYPE
CALCulate:CDPower:DBITs:TSTate
CALCulate:CDPower:IQ:COMBined[:STATe]
CALCulate:CDPower:MARKer:AOFF
CALCulate:CDPower:MARKer:COUPle[:STATe]
CALCulate:CDPower:MARKer[1]|2|...4:MAXimum
CALCulate:CDPower:MARKer[1]|2|...4:MAXimum:LEFT
CALCulate:CDPower:MARKer[1]|2|...4:MAXimum:NEXT
CALCulate:CDPower:MARKer[1]|2|...4:MAXimum:RIGHt
CALCulate:CDPower:MARKer[1]|2|...4:MINimum
CALCulate:CDPower:MARKer[1]|2|...4:MODE
CALCulate:CDPower:MARKer[1]|2|...4:PTPeak
CALCulate:CDPower:MARKer[1]|2|...4:REFerence
CALCulate:CDPower:MARKer[1]|2|...4[:SET]:DESPread
CALCulate:CDPower:MARKer[1]|2|...4:STATe
CALCulate:CDPower:MARKer[1]|2|...4:TRACe
CALCulate:CDPower:MS:ASET:THReshold
CALCulate:CDPower:MS:ASET:THReshold?
CALCulate:CDPower:MS:ASET:THReshold:AUTO
CALCulate:CDPower:MS:ASET:THReshold:AUTO?
CALCulate:CDPower:MS:AXIS
CALCulate:CDPower:MS:AXIS?
CALCulate:CDPower:MS:IQ:COMBined[:STATe]
CALCulate:CDPower:MS:IQ:COMBined[:STATe]?
CALCulate:CDPower:MS:MARKer:AOFF
CALCulate:CDPower:MS:MARKer:COUPle[:STATe]
CALCulate:CDPower:MS:MARKer:COUPle[:STATe]?
CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum
CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:LEFT
CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:NEXT
CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:RIGHt
CALCulate:CDPower:MS:MARKer[1]|2|...12:MINimum
CALCulate:CDPower:MS:MARKer[1]|2|...12:MODE
CALCulate:CDPower:MS:MARKer[1]|2|...12:MODE?
CALCulate:CDPower:MS:MARKer[1]|2|...12:PTPeak
CALCulate:CDPower:MS:MARKer[1]|2|...12:REFerence
CALCulate:CDPower:MS:MARKer[1]|2|...12:REFerence?
CALCulate:CDPower:MS:MARKer[1]|2|...12[:SET]:DESPread
CALCulate:CDPower:MS:MARKer[1]|2|...12:TRACe
CALCulate:CDPower:MS:MARKer[1]|2|...12:TRACe?
CALCulate:CDPower:MS:SEVM:FCOMpen
CALCulate:CDPower:MS:SEVM:FCOMpen?
```

```
CALCulate:CDPower:MS:SWEep:OFFSet
CALCulate:CDPower:MS:SWEep:OFFSet?
CALCulate:CDPower:MS:TYPE
CALCulate:CDPower:MS:TYPE?
CALCulate:CDPower:MS:WCODe:LENGth
CALCulate:CDPower:MS:WCODe:LENGth?
CALCulate:CDPower:MS:WCODe[:NUMBer]
CALCulate:CDPower:MS:WCODe[:NUMBer]?
CALCulate:CDPower:PACKed
CALCulate:CDPower:SWEep:OFFSet
CALCulate:CDPower:SWEep:TIME
CALCulate:CDPower:TYPE
CALCulate:CDPower:TYPE:DATA
CALCulate:CDPower:WCODe[:NUMBer]
CALCulate:CDPower:WCODe:ORDer
CALCulate:CHPower:LIMit:POWer
CALCulate:CHPower:LIMit:POWer?
CALCulate:CHPower:LIMit:POWer:FAIL?
CALCulate:CHPower:LIMit:POWer:STATe
CALCulate:CHPower:LIMit:POWer:STATe?
CALCulate:CHPower:LIMit:PSDensity
CALCulate:CHPower:LIMit:PSDensity?
CALCulate:CHPower:LIMit:PSDensity:STATe
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
CALCulate:CHPower:MARKer[1]|2|...|12:MODE?
CALCulate:CHPower:MARKer[1]|2|...|12:REFerence
CALCulate:CHPower:MARKer[1]|2|...|12:REFerence?
CALCulate:CHPower:MARKer[1]|2|...|12:STATe
CALCulate:CHPower:MARKer[1]|2|...|12:STATe?
CALCulate:CHPower:MARKer[1]|2|...|12:X
CALCulate:CHPower:MARKer[1]|2|...|12:X?
CALCulate:CHPower:MARKer[1]|2|...|12:X:POSition
CALCulate:CHPower:MARKer[1]|2|...|12:X:POSition?
CALCulate:CHPower:MARKer[1]|2|...|12:Y?
CALCulate:CLIMits:FAIL?
CALCulate:DATA<n>:COMPress?
CALCulate:DATA[n]?
CALCulate:DATA[1]|2|...|6:PEAKs?
CALCulate:DATA[1]|2|...|6:PEAKs?
CALCulate:EVMQpsk:IQOFfset:INCLude
CALCulate:EVMQpsk:IQOFfset:INCLude?
CALCulate:EVMQpsk:LIMit:FERRor
CALCulate:EVMQpsk:LIMit:FERRor?
CALCulate:EVMQpsk:LIMit:RMS
CALCulate:EVMQpsk:LIMit:RMS?
CALCulate:EVMQpsk:MARKer:AOFF
CALCulate:EVMQpsk:MARKer[1]|2|...12:CHIP
CALCulate:EVMQpsk:MARKer[1]|2|...12:CHIP?
CALCulate:EVMQpsk:MARKer:COUPle[:STATe]
```

```
CALCulate:EVMQpsk:MARKer:COUPle[:STATe]?
CALCulate:EVMQpsk:MARKer[1]|2|...12:FUNCtion:RESult?
CALCulate:EVMQpsk:MARKer[1]|2|...12:MAXimum
CALCulate:EVMQpsk:MARKer[1]|2|...12:MAXimum:LEFT
CALCulate:EVMQpsk:MARKer[1]|2|...12:MAXimum:NEXT
CALCulate:EVMQpsk:MARKer[1]|2|...12:MAXimum:RIGHt
CALCulate:EVMQpsk:MARKer[1]|2|...12:MINimum
CALCulate:EVMQpsk:MARKer[1]|2|...12:MODE
CALCulate:EVMQpsk:MARKer[1]|2|...12:MODE?
CALCulate:EVMQpsk:MARKer[1]|2|...12:PTPeak
CALCulate:EVMQpsk:MARKer[1]|2|...12:REFerence
CALCulate:EVMQpsk:MARKer[1]|2|...12:REFerence?
CALCulate:EVMQpsk:MARKer[1]|2|...12:TRACe
CALCulate:EVMQpsk:MARKer[1]|2|...12:TRACe?
CALCulate:EVMQpsk:MARKer[1]|2|...12:X
CALCulate:EVMQpsk:MARKer[1]|2|...12:X?
CALCulate:EVMQpsk:MARKer[1]|2|...12:X:POSition
CALCulate:EVMQpsk:MARKer[1]|2|...12:X:POSition?
CALCulate:EVMQpsk:MARKer[1]|2|...12:Y?
CALCulate:MCPower:OFFSet:LIST:LIMit:NEGative[:UPPer]:DATA
CALCulate:MCPower:OFFSet:LIST:LIMit:POSitive[:UPPer]:DATA
CALCulate:MONitor:MARKer:AOFF
CALCulate:MONitor:MARKer:COUPle[:STATe]
CALCulate:MONitor:MARKer:COUPle[:STATe]?
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion?
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:LEFT
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:LEFT?
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:RIGHt
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:RIGHt?
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:SPAN
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:BAND:SPAN?
CALCulate:MONitor:MARKer[1]|2|...|12:FUNCtion:RESult?
CALCulate:MONitor:MARKer[1]|2|...|12:MAXimum
CALCulate:MONitor:MARKer[1]|2|...|12:MODE
CALCulate:MONitor:MARKer[1]|2|...|12:MODE?
CALCulate:MONitor:MARKer[1]|2|...|12:REFerence
CALCulate:MONitor:MARKer[1]|2|...|12:REFerence?
CALCulate:MONitor:MARKer[1]|2|...|12:TRACe
CALCulate:MONitor:MARKer[1]|2|...|12:TRACe?
CALCulate:MONitor:MARKer[1]|2|...|12:X
CALCulate:MONitor:MARKer[1]|2|...|12:X?
CALCulate:MONitor:MARKer[1]|2|...|12:X:POSition
CALCulate:MONitor:MARKer[1]|2|...|12:X:POSition?
CALCulate:MONitor:MARKer[1]|2|...|12:Y?
CALCulate:OBWidth:LIMit:FBLimit
CALCulate:OBWidth:LIMit:FBLimit?
CALCulate:OBWidth:LIMit[:TEST]
CALCulate:OBWidth:LIMit[:TEST]?
CALCulate:OBWidth:MARKer:AOFF
CALCulate:OBWidth:MARKer[1]|2|...|12:MAXimum
CALCulate:OBWidth:MARKer[1]|2|...|12:MODE
CALCulate:OBWidth:MARKer[1]|2|...|12:MODE?
```

```
CALCulate:OBWidth:MARKer[1]|2|...|12:REFerence
CALCulate:OBWidth:MARKer[1]|2|...|12:REFerence?
CALCulate:OBWidth:MARKer[1]|2|...|12:STATe
CALCulate:OBWidth:MARKer[1]|2|...|12:STATe?
CALCulate:OBWidth:MARKer[1]|2|...|12:X
CALCulate:OBWidth:MARKer[1]|2|...|12:X?
CALCulate:OBWidth:MARKer[1]|2|...|12:X:POSition
CALCulate:OBWidth:MARKer[1]|2|...|12:X:POSition?
CALCulate:OBWidth:MARKer[1]|2|...|12:Y?
CALCulate:PSTatistic:MARKer:AOFF
CALCulate:PSTatistic:MARKer[1]|2|...|12:FUNCtion:RESult?
CALCulate:PSTatistic:MARKer[1]|2|...|12:MODE
CALCulate:PSTatistic:MARKer[1]|2|...|12:MODE?
CALCulate:PSTatistic:MARKer[1]|2|...|12:REFerence
CALCulate:PSTatistic:MARKer[1]|2|...|12:REFerence?
CALCulate:PSTatistic:MARKer[1]|2|...|12:TRACe
CALCulate:PSTatistic:MARKer[1]|2|...|12:TRACe?
CALCulate:PSTatistic:MARKer[1]|2|...|12:X
CALCulate:PSTatistic:MARKer[1]|2|...|12:X?
CALCulate:PSTatistic:MARKer[1]|2|...|12:Y?
CALCulate:PSTatistic:STORe:REFerence
CALCulate:PVTime:MARKer:AOFF
CALCulate:PVTime:MARKer:COUPle[:STATe]
CALCulate:PVTime:MARKer:COUPle[:STATe]?
CALCulate:PVTime:MARKer[1]|2|...12:MAXimum
CALCulate:PVTime:MARKer[1]|2|...12:MODE
CALCulate:PVTime:MARKer[1]|2|...12:MODE?
CALCulate:PVTime:MARKer[1]|2|...12:REFerence
CALCulate:PVTime:MARKer[1]|2|...12:REFerence?
CALCulate:PVTime:MARKer[1]|2|...12:TRACe
CALCulate:PVTime:MARKer[1]|2|...12:TRACe?
CALCulate:RHO:ASET:THReshold
CALCulate:RHO[:BTS]:ASET:THReshold
CALCulate:RHO[:BTS]:ASET:THReshold?
CALCulate:RHO[:BTS]:ASET:THReshold:AUTO
CALCulate:RHO[:BTS]:ASET:THReshold:AUTO?
CALCulate:RHO[:BTS]:CHANnel:TYPE:DATA
CALCulate:RHO[:BTS]:CHANnel:TYPE:DATA?
CALCulate:RHO[:BTS]:IQ:COMBined[:STATe]
CALCulate:RHO[:BTS]:IQ:COMBined[:STATe]?
CALCulate:RHO[:BTS]:IQOFfset:INCLude
CALCulate:RHO[:BTS]:IQOFfset:INCLude?
CALCulate:RHO[:BTS]:LIMit:DATA[:ACTive]:LOWer
CALCulate:RHO[:BTS]:LIMit:DATA[:ACTive]:LOWer?
CALCulate:RHO[:BTS]:LIMit:DATA[:ACTive][:UPPer]
CALCulate:RHO[:BTS]:LIMit:DATA[:ACTive][:UPPer]?
CALCulate:RHO[:BTS]:LIMit:FREQuency
CALCulate:RHO[:BTS]:LIMit:FREQuency?
CALCulate:RHO[:BTS]:LIMit:MAC:INACtive[:UPPer]
CALCulate:RHO[:BTS]:LIMit:MAC:INACtive[:UPPer]?
CALCulate:RHO[:BTS]:LIMit:PEAK
CALCulate:RHO[:BTS]:LIMit:PEAK?
CALCulate:RHO[:BTS]:LIMit:PHASe
```

```
CALCulate:RHO[:BTS]:LIMit:PHASe?
CALCulate:RHO[:BTS]:LIMit:POFFset
CALCulate:RHO[:BTS]:LIMit:POFFset?
CALCulate:RHO[:BTS]:LIMit:PRESet
CALCulate:RHO[:BTS]:LIMit:PRESet?
CALCulate:RHO[:BTS]:LIMit:RHO:ALL
CALCulate:RHO[:BTS]:LIMit:RHO:ALL?
CALCulate:RHO[:BTS]:LIMit:RHO:DATA
CALCulate:RHO[:BTS]:LIMit:RHO:DATA?
CALCulate:RHO[:BTS]:LIMit:RHO:MAC
CALCulate:RHO[:BTS]:LIMit:RHO:MAC?
CALCulate:RHO[:BTS]:LIMit:RHO:PILot
CALCulate:RHO[:BTS]:LIMit:RHO:PILot?
CALCulate:RHO[:BTS]:LIMit:RHO:PREamble
CALCulate:RHO[:BTS]:LIMit:RHO:PREamble?
CALCulate:RHO[:BTS]:LIMit:RMS
CALCulate:RHO[:BTS]:LIMit:RMS?
CALCulate:RHO[:BTS]:LIMit:TIMing
CALCulate:RHO[:BTS]:LIMit:TIMing?
CALCulate:RHO[:BTS]:MARKer:AOFF
CALCulate:RHO[:BTS]:MARKer:COUPle[:STATe]
CALCulate:RHO[:BTS]:MARKer:COUPle[:STATe]?
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MAXimum
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MAXimum:LEFT
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MAXimum:NEXT
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MAXimum:RIGHt
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MINimum
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MODE
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:MODE?
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:PTPeak
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:REFerence
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:REFerence?
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:TRACe
CALCulate:RHO[:BTS]:MARKer[1]|2|...12:TRACe?
CALCulate:RHO[:BTS]:SWEep:OFFSet
CALCulate:RHO[:BTS]:SWEep:OFFSet?
CALCulate:RHO[:BTS]:WCODe:ORDer
CALCulate:RHO[:BTS]:WCODe:ORDer?
CALCulate:RHO:CHANnel:TYPE:DATA
CALCulate:RHO:IQ:COMBined[:STATe]
CALCulate:RHO:IQOFfset:INCLude
CALCulate:RHO:LIMit:DATA[:ACTive]:LOWer
CALCulate:RHO:LIMit:DATA[:ACTive][:UPPer]
CALCulate:RHO:LIMit:FREQuency
CALCulate:RHO:LIMit:MAC:INACtive[:UPPer]
CALCulate:RHO:LIMit:PEAK
CALCulate:RHO:LIMit:PHASe
CALCulate:RHO:LIMit:POFFset
CALCulate:RHO:LIMit:PRESet
CALCulate:RHO:LIMit:RHO:ALL
CALCulate:RHO:LIMit:RHO:DATA
CALCulate:RHO:LIMit:RHO:MAC
CALCulate:RHO:LIMit:RHO:PILot
```

```
CALCulate:RHO:LIMit:RHO:PREamble
CALCulate:RHO:LIMit:RMS
CALCulate:RHO:LIMit:TIMing
CALCulate:RHO:MARKer:AOFF
CALCulate:RHO:MS:ASET:THReshold
CALCulate:RHO:MS:ASET:THReshold?
CALCulate:RHO:MS:ASET:THReshold:AUTO
CALCulate:RHO:MS:ASET:THReshold:AUTO?
CALCulate:RHO:MS:IQ:COMBined[:STATe]
CALCulate:RHO:MS:IQ:COMBined[:STATe]?
CALCulate:RHO:MS:IQOFfset:INCLude
CALCulate:RHO:MS:IQOFfset:INCLude?
CALCulate:RHO:MS:LIMit:ACDPower[:SUB0]
CALCulate:RHO:MS:LIMit:ACDPower[:SUB0]?
CALCulate:RHO:MS:LIMit:ACK:GAIN[:SUB0]
CALCulate:RHO:MS:LIMit:ACK:GAIN[:SUB0]?
CALCulate:RHO:MS:LIMit:CDERror[:SUB0]
CALCulate:RHO:MS:LIMit:CDERror[:SUB0]?
CALCulate:RHO:MS:LIMit:DATA:GAIN[:SUB0]
CALCulate:RHO:MS:LIMit:DATA:GAIN[:SUB0]?
CALCulate:RHO:MS:LIMit:DRC:GAIN[:SUB0]
CALCulate:RHO:MS:LIMit:DRC:GAIN[:SUB0]?
CALCulate:RHO:MS:LIMit:FERRor[:SUB0]
CALCulate:RHO:MS:LIMit:FERRor[:SUB0]?
CALCulate:RHO:MS:LIMit:ICDPower[:SUB0]
CALCulate:RHO:MS:LIMit:ICDPower[:SUB0]?
CALCulate:RHO:MS:LIMit:PEAK[:SUB0]
CALCulate:RHO:MS:LIMit:PEAK[:SUB0]?
CALCulate:RHO:MS:LIMit:POFFset[:SUB0]
CALCulate:RHO:MS:LIMit:POFFset[:SUB0]?
CALCulate:RHO:MS:LIMit:RHO[:SUB0]
CALCulate:RHO:MS:LIMit:RHO[:SUB0]?
CALCulate:RHO:MS:LIMit:RMS[:SUB0]
CALCulate:RHO:MS:LIMit:RMS[:SUB0]?
CALCulate:RHO:MS:LIMit:RRI[:SUB0]
CALCulate:RHO:MS:LIMit:RRI[:SUB0]?
CALCulate:RHO:MS:MARKer:AOFF
CALCulate:RHO:MS:MARKer:COUPle[:STATe]
CALCulate:RHO:MS:MARKer:COUPle[:STATe]?
CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum
CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:LEFT
CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:NEXT
CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:RIGHt
CALCulate:RHO:MS:MARKer[1]|2|...12:MINimum
CALCulate:RHO:MS:MARKer[1]|2|...12:MODE
CALCulate:RHO:MS:MARKer[1]|2|...12:MODE?
CALCulate:RHO:MS:MARKer[1]|2|...12:PTPeak
CALCulate:RHO:MS:MARKer[1]|2|...12:REFerence
CALCulate:RHO:MS:MARKer[1]|2|...12:REFerence?
CALCulate:RHO:MS:MARKer[1]|2|...12:TRACe
CALCulate:RHO:MS:MARKer[1]|2|...12:TRACe?
CALCulate:RHO:MS:SWEep:OFFSet
CALCulate:RHO:MS:SWEep:OFFSet?
```

```
CALCulate:RHO:MS:WCODe:ORDer
CALCulate:RHO:MS:WCODe:ORDer?
CALCulate:RHO:SWEep:OFFSet
CALCulate:RHO:WCODe:ORDer
CALCulate:SEMask:LLINe:STATe
CALCulate:SEMask:LLINe:STATe?
CALCulate:SEMask:MARKer:AOFF
CALCulate:SEMask:MARKer:COUPle[:STATe]
CALCulate:SEMask:MARKer:COUPle[:STATe]?
CALCulate:SEMask:MARKer[1]|2|...|12:FUNCtion:RESult?
CALCulate:SEMask:MARKer[1]|2|...|12:MODE
CALCulate:SEMask:MARKer[1]|2|...|12:MODE?
CALCulate:SEMask:MARKer[1]|2|...|12:X
CALCulate:SEMask:MARKer[1]|2|...|12:X?
CALCulate:SEMask:MARKer[1]|2|...|12:X:POSition
CALCulate:SEMask:MARKer[1]|2|...|12:X:POSition?
CALCulate:SEMask:MARKer[1]|2|...|12:Y?
CALCulate:SPURious:MARKer:AOFF
CALCulate:SPURious:MARKer:COUPle[:STATe]
CALCulate:SPURious:MARKer:COUPle[:STATe]?
CALCulate:SPURious:MARKer[1]|2|...|12:MAXimum
CALCulate:SPURious:MARKer[1]|2|...|12:MAXimum:LEFT
CALCulate:SPURious:MARKer[1]|2|...|12:MAXimum:NEXT
CALCulate:SPURious:MARKer[1]|2|...|12:MAXimum:RIGHt
CALCulate:SPURious:MARKer[1]|2|...|12:MINimum
CALCulate:SPURious:MARKer[1]|2|...|12:MODE
CALCulate:SPURious:MARKer[1]|2|...|12:MODE?
CALCulate:SPURious:MARKer[1]|2|...|12:PTPeak
CALCulate:SPURious:MARKer[1]|2|...|12:REFerence
CALCulate:SPURious:MARKer[1]|2|...|12:REFerence?
CALCulate:SPURious:MARKer[1]|2|...|12:X
CALCulate:SPURious:MARKer[1]|2|...|12:X?
CALCulate:SPURious:MARKer[1]|2|...|12:X:POSition
CALCulate:SPURious:MARKer[1]|2|...|12:X:POSition?
CALCulate:SPURious:MARKer[1]|2|...|12:Y?
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt]
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt]?
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP?
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO
CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO?
CALCulate:TCDPower:ASET:THReshold
CALCulate:TCDPower:AXIS
CALCulate:TCDPower:IQ:COMBined[:STATe]
CALCulate:TCDPower:MARKer:AOFF
CALCulate:TCDPower:MARKer:COUPle[:STATe]
CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum
CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum:LEFT
CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum:NEXT
CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum:RIGHt
CALCulate:TCDPower:MARKer[1]|2|...4:MINimum
CALCulate:TCDPower:MARKer[1]|2|...4:MODE
CALCulate:TCDPower:MARKer[1]|2|...4:PTPeak
```

```
CALCulate:TCDPower:MARKer[1]|2|...4:REFerence
CALCulate:TCDPower:MARKer[1]|2|...4[:SET]:DESPread
CALCulate:TCDPower:MARKer[1]|2|...4:TRACe
CALCulate:TCDPower:SEVM:FCOMpen
CALCulate:TCDPower:SWEep:OFFSet
CALCulate:TCDPower:TYPE
CALCulate:TCDPower:WCODe:LENGth
CALCulate:TCDPower:WCODe[:NUMBer]
CALCulate:TRHO:ASET:THReshold
CALCulate:TRHO:IQ:COMBined[:STATe]
CALCulate:TRHO:IQOFfset:INCLude
CALCulate:TRHO:LIMit:ACDPower[:SUB0]
CALCulate:TRHO:LIMit:ACK:GAIN[:SUB0]
CALCulate:TRHO:LIMit:CDERror[:SUB0]
CALCulate:TRHO:LIMit:DATA:GAIN[:SUB0]
CALCulate:TRHO:LIMit:DRC:GAIN[:SUB0]
CALCulate:TRHO:LIMit:FERRor[:SUB0]
CALCulate:TRHO:LIMit:ICDPower[:SUB0]
CALCulate:TRHO:LIMit:PEAK[:SUB0]
CALCulate:TRHO:LIMit:POFFset[:SUB0]
CALCulate:TRHO:LIMit:RHO[:SUB0]
CALCulate:TRHO:LIMit:RMS[:SUB0]
CALCulate:TRHO:LIMit:RRI[:SUB0]
CALCulate:TRHO:MARKer:AOFF
CALCulate:TRHO:MARKer[1]|2|...4:MAXimum
CALCulate:TRHO:MARKer[1]|2|...4:MAXimum:LEFT
CALCulate:TRHO:MARKer[1]|2|...4:MAXimum:NEXT
CALCulate:TRHO:MARKer[1]|2|...4:MAXimum:RIGHt
CALCulate:TRHO:MARKer[1]|2|...4:MINimum
CALCulate:TRHO:MARKer[1]|2|...4:PTPeak
CALCulate:TRHO:MARKer[1]|2|...4:TRACe
CALCulate:TRHO:SWEep:OFFSet
CALCulate:TRHO:WCODe:ORDer
CALCulate:WAVeform:MARKer:AOFF
CALCulate:WAVeform:MARKer:COUPle[:STATe]
CALCulate:WAVeform:MARKer:COUPle[:STATe]?
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion?
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion:BAND:LEFT
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion:BAND:LEFT?
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion:BAND:RIGHt
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion:BAND:RIGHt?
CALCulate:WAVeform:MARKer[1]|2|...|12:FUNCtion:BAND:SPAN
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
CALCulate:WAVeform:MARKer[1]|2|...|12:MINimum
CALCulate:WAVeform:MARKer[1]|2|...|12:MODE
CALCulate:WAVeform:MARKer[1]|2|...|12:MODE?
CALCulate:WAVeform:MARKer[1]|2|...|12:REFerence
CALCulate:WAVeform:MARKer[1]|2|...|12:REFerence?
CALCulate:WAVeform:MARKer[1]|2|...|12:TRACe
```

```
CALCulate:WAVeform:MARKer[1]|2|...|12:TRACe?
CALCulate:WAVeform:MARKer[1]|2|...|12:X
CALCulate:WAVeform:MARKer[1]|2|...|12:X?
CALCulate:WAVeform:MARKer[1]|2|...|12:X:POSition
CALCulate:WAVeform:MARKer[1]|2|...|12:X:POSition?
CALCulate:WAVeform:MARKer[1]|2|...|4:X:SPAN
CALCulate:WAVeform:MARKer[1]|2|...|12:Y?
CONFigure?
CONFigure:ACP
CONFigure:ACP:NDEFault
CONFigure:ACPower
CONFigure:CDPower
CONFigure:CDPower
CONFigure:CDPower[:BTS]
CONFigure:CDPower[:BTS]:NDEFault
CONFigure:CHPower
CONFigure:CHPower
CONFigure:CHPower:NDEFault
CONFigure:EVMQpsk
CONFigure:EVMQpsk
CONFigure:EVMQpsk:NDEFault
CONFigure:MONitor
CONFigure:MONitor
CONFigure:MONitor:NDEFault
CONFigure:OBWidth
CONFigure:OBWidth
CONFigure:OBWidth:NDEFault
CONFigure:PSTatistic
CONFigure:PSTatistic
CONFigure:PSTatistic:NDEFault
CONFigure:PVTime
CONFigure:RHO[:BTS]
CONFigure:RHO:MS
CONFigure:SEMask
CONFigure:SEMask
CONFigure:SEMask:NDEFault
CONFigure:SPURious
CONFigure:SPURious
CONFigure:SPURious:NDEFault
CONFigure:TRHO
CONFigure:WAVeform
CONFigure:WAVeform
CONFigure:WAVeform:NDEFault
COUPle
```

D

```
DISPlay:<measurement>:ANNotation:TITLe:DATA
DISPlay:<measurement>:ANNotation:TITLe:DATA?
DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph
DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph?
```

```
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:ACTivefunc[:STATe]
DISPlay:ACTivefunc[:STATe]?
DISPlay:ANNotation:MBAR[:STATe]
DISPlay:ANNotation:MBAR[:STATe]?
DISPlay:ANNotation:SCReen[:STATe]
DISPlay:ANNotation:SCReen[:STATe]?
DISPlay:CDPower[:BTS]:VIEW:NSELect
DISPlay:CDPower[:BTS]:VIEW:NSELect?
DISPlay:CDPower[:BTS]:VIEW[:SELect]
DISPlay:CDPower[:BTS]:VIEW[:SELect]?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:X[:SCALe]:RPOSition?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle?
```

```
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower[:BTS]:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:RPOSition
DISPlay:CDPower[:BTS]:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition?
DISPlay:CDPower[:BTS]:VIEW3:WINDow4:TRACe:Y[:SCALe]:RPOSition?
DISPlay:CDPower[:BTS]:VIEW4:WINDow2:TRACe:Y[:SCALe]:RPOSition?
DISPlay:CDPower:MS:MARKer:CONSolidated
DISPlay:CDPower:MS:MARKer:CONSolidated?
DISPlay:CDPower:MS:VIEW:NSELect
DISPlay:CDPower:MS:VIEW:NSELect?
DISPlay:CDPower:MS:VIEW[:SELect]
DISPlay:CDPower:MS:VIEW[:SELect]?
DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?
DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
```

```
DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?
DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CDPower:VIEW:NSELect
DISPlay:CDPower:VIEW[:SELect]
DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow4:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower:VIEW3:WINDow4:TRACe:X[:SCALe]:PDIVision
DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower:VIEW3:WINDow4:TRACe:X[:SCALe]:RLEVel
DISPlay:CDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower:VIEW3:WINDow4:TRACe:X[:SCALe]:RPOSition
DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow4:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW4:WINDow1:TRACe:Y[:SCALe]:COUPle
DISPlay:CDPower:VIEW3:WINDow4:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW3:WINDow4:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel
DISPlay:CDPower:VIEW4:WINDow2:TRACe:Y[:SCALe]:RPOSition
DISPlay:CDPower:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition
DISPlay:CDPower:VIEW3:WINDow4:TRACe:Y[:SCALe]:RPOSition
DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph
DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
```

```
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:ENABle
DISPlay:ENABle?
DISPlay:EVMQpsk:VIEW:NSELect
DISPlay:EVMQpsk:VIEW:NSELect?
DISPlay:EVMQpsk:VIEW[:SELect]
DISPlay:EVMQpsk:VIEW[:SELect]?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:COFFset
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:COFFset?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:FVECtor[:STATe]
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:FVECtor[:STATe]?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:INTPolation[:STATe]
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:INTPolation[:STATe]?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:IQCHips
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:IQCHips?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:POLar
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:POLar?
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:ROTQpi[:STATe]
DISPlay:EVMQpsk:VIEW[1]:WINDow2:TRACe:ROTQpi[:STATe]?
DISPlay:FSCReen[:STATe]
DISPlay:FSCReen[:STATe]?
DISPlay:MENU[:STATe]
DISPlay:MONitor:VIEW:NSELect
DISPlay:MONitor:VIEW:NSELect?
DISPlay:MONitor:VIEW[:SELect]
DISPlay:MONitor:VIEW[:SELect]?
DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:CLEar
DISPlay:MONitor:VIEW:WINDow:TRACe:CLEar:ALL
DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:TYPE
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:PSTatistic:GAUSsian[:STATe]
DISPlay:PSTatistic:GAUSsian[:STATe]?
DISPlay:PSTatistic:RTRace[:STATe]
DISPlay:PSTatistic:RTRace[:STATe]?
DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision
```

DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision?
DISPlay:PSTatistic:XSCale
DISPlay:PVTime:BURSt:STHReshold
DISPlay:PVTime:BURSt:STHReshold?
DISPlay:PVTime:LIMit:MASK
DISPlay:PVTime:LIMit:MASK?
DISPlay:PVTime:VIEW
DISPlay:PVTime:VIEW?
DISPlay:PVTime:VIEW:WINDow:TRACe:MAXHold[:STATe]
DISPlay:PVTime:VIEW:WINDow:TRACe:MAXHold[:STATe]?
DISPlay:PVTime:VIEW:WINDow:TRACe:MINHold[:STATe]
DISPlay:PVTime:VIEW:WINDow:TRACe:MINHold[:STATe]?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:RHO[:BTS]:CDEScramble[:STATe]
DISPlay:RHO[:BTS]:CDEScramble[:STATe]?
DISPlay:RHO[:BTS]:CHANnel:TYPE
DISPlay:RHO[:BTS]:CHANnel:TYPE?
DISPlay:RHO[:BTS]:FVECtor[:STATe]
DISPlay:RHO[:BTS]:FVECtor[:STATe]?
DISPlay:RHO[:BTS]:INTerpolate
DISPlay:RHO[:BTS]:INTerpolate?
DISPlay:RHO[:BTS]:IQCHips
DISPlay:RHO[:BTS]:IQCHips?
DISPlay:RHO[:BTS]:IQPType
DISPlay:RHO[:BTS]:IQPType?
DISPlay:RHO[:BTS]:OFFSet
DISPlay:RHO[:BTS]:OFFSet?
DISPlay:RHO[:BTS]:ROTQpi[:STATe]
DISPlay:RHO[:BTS]:ROTQpi[:STATe]?
DISPlay:RHO[:BTS]:VIEW:NSELect
DISPlay:RHO[:BTS]:VIEW:NSELect?
DISPlay:RHO[:BTS]:VIEW[:SELect]
DISPlay:RHO[:BTS]:VIEW[:SELect]?
DISPlay:RHO:CHANnel:TYPE
DISPlay:RHO:MS:FVECtor[:STATe]
DISPlay:RHO:MS:FVECtor[:STATe]?
DISPlay:RHO:MS:INTerpolate
DISPlay:RHO:MS:INTerpolate?

```
DISPlay:RHO:MS:IQCHips
DISPlay:RHO:MS:IQCHips?
DISPlay:RHO:MS:IQPType
DISPlay:RHO:MS:IQPType?
DISPlay:RHO:MS:MARKer:CONSolidated
DISPlay:RHO:MS:MARKer:CONSolidated?
DISPlay:RHO:MS:OFFSet
DISPlay:RHO:MS:OFFSet?
DISPlay:RHO:MS:ROTQpi[:STATe]
DISPlay:RHO:MS:ROTQpi[:STATe]?
DISPlay:RHO:MS:VIEW:NSELect
DISPlay:RHO:MS:VIEW:NSELect?
DISPlay:RHO:MS:VIEW[:SELect]
DISPlay:RHO:MS:VIEW[:SELect]?
DISPlay:RHO:VIEW:NSELect
DISPlay:RHO:VIEW[:SELect]
DISPlay:SEMask:VIEW:NSELect
DISPlay:SEMask:VIEW:NSELect?
DISPlay:SEMask:VIEW[:SELect]
DISPlay:SEMask:VIEW[:SELect]?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:SPURious:VIEW:RANGe[:SELect]
DISPlay:SPURious:VIEW:RANGe[:SELect]?
DISPlay:SPURious:VIEW:RANGe:TABLe
DISPlay:SPURious:VIEW:RANGe:TABLe?
DISPlay:SPURious:VIEW[:SELect]
DISPlay:SPURious:VIEW[:SELect]?
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:TCDPower:MARKer:CONSolidated
DISPlay:TCDPower:VIEW:NSELect
DISPlay:TCDPower:VIEW[:SELect]
DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle
DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision
```

```
DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel
DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition
DISPlay:TCDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision
DISPlay:TCDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
DISPlay:TRHO:MARKer:CONSolidated
DISPlay:TRHO:VIEW:NSELect
DISPlay:TRHO:VIEW[:SELect]
DISPlay:WAVeform:VIEW:NSELect
DISPlay:WAVeform:VIEW:NSELect?
DISPlay:WAVeform:VIEW[:SELect]
DISPlay:WAVeform:VIEW[:SELect]?
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle
DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
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]:PDIVision?
DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel
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]:RLEVel?
DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition
DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:WINDow[1]:ANNotation[:ALL]
DISPlay:WINDow[1]:ANNotation[:ALL]?
DISPlay:WINDow:FORMat:TILE
DISPlay:WINDow:FORMat:ZOOM
DISPlay:WINDow[:SELect]
DISPlay:WINDow[:SELect]?
DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]
DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
```

F

```
FETCh:ACP[n]?
FETCh:CDPower[:BTS][n]?
FETCh:CHPower:CHPower?
FETCh:CHPower:DENSity?
FETCh:CHPower[n]?
FETCh:EVMQpsk[n]?
FETCh:MONitor[n]?
```

FETCh:OBWidth:FERRor?
FETCh:OBWidth[n]?
FETCh:OBWidth:OBWidth?
FETCh:OBWidth:XDB?
FETCh:PSTatistic[n]?
FETCh:SEMask[n]?
FETCh:SPURious[n]?
FETCh:WAVeform[n]?
FORMat:BORDer
FORMat:BORDer?
FORMat[:TRACe][:DATA]
FORMat[:TRACe][:DATA]?

G

GLOBal:DEFault
GLOBal:FREQuency:CENTer[:STATe]
GLOBal:FREQuency:CENTer[:STATe]?

I

INITiate:ACP
INITiate:CDPower[:BTS]
INITiate:CHPower
INITiate:CONTinuous
INITiate:CONTinuous?
INITiate[:IMMediate]
INITiate:MONitor
INITiate:OBWidth
INITiate:PAUSe
INITiate:PSTatistic
INITiate:RESTart
INITiate:RESume
INITiate:SEMask
INITiate:SPURious
INITiate:WAVeform
INPut:MIXer
INPut:MIXer?
INSTrument:CATalog?
INSTrument:COUPle:DEFault
INSTrument:COUPle:FREQuency:CENTer
INSTrument:COUPle:FREQuency:CENTer?
INSTrument:NSELect
INSTrument:NSELect?
INSTrument[:SELect]
INSTrument[:SELect]?

M

```
MEASure:ACP[n]?
MEASure:CDPower[:BTS][n]?
MEASure:CHPower:CHPower?
MEASure:CHPower:DENSity?
MEASure:CHPower[n]?
MEASure:EVMQpsk[n]?
MEASure:MONitor[n]?
MEASure:OBWidth:FERRor?
MEASure:OBWidth[n]?
MEASure:OBWidth:OBWidth?
MEASure:OBWidth:XDB?
MEASure:PSTatistic[n]?
MEASure:SEMask[n]?
MEASure:SPURious[n]?
MEASure:WAVeform[n]?
MMEMory:CATalog?
MMEMory:CDIRectory
MMEMory:CDIRectory?
MMEMory:COPY
MMEMory:COPY:DEVice
MMEMory:DATA
MMEMory:DATA?
MMEMory:DELete
MMEMory:LOAD:STATe
MMEMory:LOAD:STATe
MMEMory:MDIRectory
MMEMory:MOVE
MMEMory:RDIRectory
MMEMory:REGister:STATe:LABel
MMEMory:REGister:STATe:LABel?
MMEMory:STORe:RESults
MMEMory:STORe:RESults
MMEMory:STORe:RESults
MMEMory:STORe:RESults
MMEMory:STORe:RESults
MMEMory:STORe:RESults
MMEMory:STORe:RESults:MTABle|PTABle|SPECtrogram
MMEMory:STORe:SCReen
MMEMory:STORe:SCReen:THEMe
MMEMory:STORe:SCReen:THEMe?
MMEMory:STORe:STATe
MMEMory:STORe:STATe
```

R

```
READ:ACP[n]?
READ:CDPower[:BTS][n]?
```

READ:CHPower:CHPower?
READ:CHPower:DENSity
READ:CHPower[n]?
READ:EVMQpsk[n]?
READ:MONitor[n]?
READ:OBWidth:FERRor?
READ:OBWidth[n]?
READ:OBWidth:OBWidth?
READ:OBWidth:XDB?
READ:PSTatistic[n]?
READ:SEMask[n]?
READ:SPURious[n]?
READ:WAVeform[n]?

S

[:SENSe]:<measurement>:TRIGger:SOURce
[:SENSe]:<measurement>:TRIGger:SOURce
[:SENSe]:ACPower:AVERage:COUNt
[:SENSe]:ACPower:AVERage:COUNt?
[:SENSe]:ACPower:AVERage[:STATe]
[:SENSe]:ACPower:AVERage[:STATe]?
[:SENSe]:ACPower:AVERage:TCONtrol
[:SENSe]:ACPower:AVERage:TCONtrol?
[:SENSe]:ACPower:BANDwidth:INTegration
[:SENSe]:ACPower:BANDwidth[:RESolution]
[:SENSe]:ACPower:BANDwidth[:RESolution]?
[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO
[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO?
[:SENSe]:ACPower:BANDwidth:SHAPe
[:SENSe]:ACPower:BANDwidth:SHAPe?
[:SENSe]:ACPower:BANDwidth:TYPE
[:SENSe]:ACPower:BANDwidth:TYPE?
[:SENSe]:ACPower:BANDwidth:VIDeo
[:SENSe]:ACPower:BANDwidth:VIDeo?
[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO
[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO?
[:SENSe]:ACPower:BWIDth:INTegration
[:SENSe]:ACPower:BWIDth[:RESolution]
[:SENSe]:ACPower:BWIDth:SHAPe
[:SENSe]:ACPower:BWIDth:TYPE
[:SENSe]:ACPower:BWIDth:VIDeo
[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe]
[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe]?
[:SENSe]:ACPower:CARRier[1]|2:COUNt
[:SENSe]:ACPower:CARRier[1]|2:COUNt?
[:SENSe]:ACPower:CARRier[1]|2:CPSD
[:SENSe]:ACPower:CARRier[1]|2:CPSD?
[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]
[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]?
[:SENSe]:ACPower:CARRier[1]|2:LIST:BWIDth[:INTegration]

```
[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod
[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod?
[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent
[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent?
[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh
[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh?
[:SENSe]:ACPower:CARRier[1]|2[:POWer]
[:SENSe]:ACPower:CARRier[1]|2[:POWer]?
[:SENSe]:ACPower:CARRier[1]|2:RCARrier
[:SENSe]:ACPower:CARRier[1]|2:RCARrier?
[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO
[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO?
[:SENSe]:ACPower:CARRier[1]|2:RCFRequency
[:SENSe]:ACPower:CARRier[1]|2:RCFRequency?
[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO
[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO?
[:SENSe]:ACPower:CORRection:NOISe[:AUTO]
[:SENSe]:ACPower:CORRection:NOISe[:AUTO]?
[:SENSe]:ACPower:DETector:AUTO
[:SENSe]:ACPower:DETector:AUTO?
[:SENSe]:ACPower:DETector[:FUNCtion]
[:SENSe]:ACPower:DETector[:FUNCtion]?
[:SENSe]:ACPower:FILTer[:RRC]:ALPHa
[:SENSe]:ACPower:FILTer[:RRC]:ALPHa?
[:SENSe]:ACPower:FILTer[:RRC][:STATe]
[:SENSe]:ACPower:FILTer[:RRC][:STATe]?
[:SENSe]:ACPower:FREQuency:SPAN
[:SENSe]:ACPower:FREQuency:SPAN?
[:SENSe]:ACPower:FREQuency:SPAN:FULL
[:SENSe]:ACPower:FREQuency:SPAN:PREVious
[:SENSe]:ACPower:FREQuency:SYNThesis:AUTO[:STATe]
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[:SENSe]:ACPower:FREQuency:SYNThesis[:STATe]
[:SENSe]:ACPower:FREQuency:SYNThesis[:STATe]?
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[:SENSe]:ACPower:METHod?
[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth[:INTegration]
[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:RESolution
[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:SHAPe
[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:TYPE
[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:VIDeo
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:ABSolute
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:ABSolute?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:INTegration]
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:INTegration]?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution:AUTO
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution:AUTO?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:SHAPe
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:SHAPe?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:TYPE
```

```
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[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST[:FREQuency]
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST[:FREQuency]?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RCARrier
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RCARrier?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RPSDensity
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RPSDensity?
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[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:SIDE?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:STATe
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:STATe?
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[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:TEST?
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:TYPE
[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:TYPE?
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[:SENSe]:ACPower:SWEep:POINts?
[:SENSe]:ACPower:SWEep:TIME
[:SENSe]:ACPower:SWEep:TIME?
[:SENSe]:ACPower:SWEep:TIME:AUTO
[:SENSe]:ACPower:SWEep:TIME:AUTO?
[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes
[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes?
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[:SENSe]:ACPower:TYPE?
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[:SENSe]:ACPR:AVERage:TCONtrol
[:SENSe]:ACPR:FILTer[:RRC]:ALPHa
[:SENSe]:ACPR:FILTer[:RRC][:STATe]
[:SENSe]:ACPR:OFFSet[1]|2:LIST:ABSolute
[:SENSe]:ACPR:OFFSet[1]|2:LIST:BANDwidth
[:SENSe]:ACPR:OFFSet[1]|2:LIST:BWIDth
[:SENSe]:ACPR:SWEep:DETector[:FUNCtion]
[:SENSe]:ACPR:SWEep:TYPE
[:SENSe]:ACPR:TRIGger:SOURce
[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution]
[:SENSe]:CDPower:ACODe
[:SENSe]:CDPower:ALPHa
[:SENSe]:CDPower[:BTS]:ACODe
[:SENSe]:CDPower[:BTS]:ACODe?
[:SENSe]:CDPower[:BTS]:ALPHa
[:SENSe]:CDPower[:BTS]:ALPHa?
[:SENSe]:CDPower[:BTS]:CAPTure:TIME
[:SENSe]:CDPower[:BTS]:CAPTure:TIME?
[:SENSe]:CDPower[:BTS]:CRATe
[:SENSe]:CDPower[:BTS]:CRATe?
[:SENSe]:CDPower[:BTS]:IF:GAIN:AUTO[:STATe]
[:SENSe]:CDPower[:BTS]:IF:GAIN:AUTO[:STATe]?
[:SENSe]:CDPower[:BTS]:IF:GAIN[:STATe]
```

```
[:SENSe]:CDPower[:BTS]:IF:GAIN[:STATe]?
[:SENSe]:CDPower[:BTS]:MACPosition
[:SENSe]:CDPower[:BTS]:MACPosition?
[:SENSe]:CDPower[:BTS]:PNOFfset
[:SENSe]:CDPower[:BTS]:PNOFfset?
[:SENSe]:CDPower[:BTS]:PREamble:LENGth
[:SENSe]:CDPower[:BTS]:PREamble:LENGth?
[:SENSe]:CDPower[:BTS]:PREamble:LENGth:AUTO
[:SENSe]:CDPower[:BTS]:PREamble:LENGth:AUTO?
[:SENSe]:CDPower[:BTS]:SPECtrum
[:SENSe]:CDPower[:BTS]:SPECtrum?
[:SENSe]:CDPower[:BTS]:SSLot:NUMBer
[:SENSe]:CDPower[:BTS]:SSLot:NUMBer?
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[:SENSe]:CDPower[:BTS]:SSLot[:STATe]?
[:SENSe]:CDPower:CAPTure:TIME
[:SENSe]:CDPower:CRATe
[:SENSe]:CDPower:IF:GAIN:AUTO[:STATe]
[:SENSe]:CDPower:IF:GAIN[:STATe]
[:SENSe]:CDPower:MS:ACODe
[:SENSe]:CDPower:MS:ACODe?
[:SENSe]:CDPower:MS:ACODe:ACK
[:SENSe]:CDPower:MS:ACODe:ACK?
[:SENSe]:CDPower:MS:ACODe:DATA
[:SENSe]:CDPower:MS:ACODe:DATA?
[:SENSe]:CDPower:MS:ACODe:DRC
[:SENSe]:CDPower:MS:ACODe:DRC?
[:SENSe]:CDPower:MS:ACODe:PILot
[:SENSe]:CDPower:MS:ACODe:PILot?
[:SENSe]:CDPower:MS:ALPHa
[:SENSe]:CDPower:MS:ALPHa?
[:SENSe]:CDPower:MS:CAPTure:TIME
[:SENSe]:CDPower:MS:CAPTure:TIME?
[:SENSe]:CDPower:MS:CRATe
[:SENSe]:CDPower:MS:CRATe?
[:SENSe]:CDPower:MS:FERRor:TRANge
[:SENSe]:CDPower:MS:FERRor:TRANge?
[:SENSe]:CDPower:MS:IF:GAIN:AUTO[:STATe]
[:SENSe]:CDPower:MS:IF:GAIN:AUTO[:STATe]?
[:SENSe]:CDPower:MS:IF:GAIN[:STATe]
[:SENSe]:CDPower:MS:IF:GAIN[:STATe]?
[:SENSe]:CDPower:MS:SPECtrum
[:SENSe]:CDPower:MS:SPECtrum?
[:SENSe]:CDPower:MS:SSLot:NUMBer
[:SENSe]:CDPower:MS:SSLot:NUMBer?
[:SENSe]:CDPower:MS:SSLot[:STATe]
[:SENSe]:CDPower:MS:SSLot[:STATe]
[:SENSe]:CDPower:MS:SSLot[:STATe]?
[:SENSe]:CDPower:MS:SSLot[:STATe]?
[:SENSe]:CDPower:MS:SYNC
[:SENSe]:CDPower:MS:SYNC?
[:SENSe]:CDPower:MS:SYNC:ILCMask
[:SENSe]:CDPower:MS:SYNC:ILCMask?
```

[:SENSe]:CDPower:MS:SYNC:QLCMask
[:SENSe]:CDPower:MS:SYNC:QLCMask?
[:SENSe]:CDPower:PNOFfset
[:SENSe]:CDPower:SPECtrum
[:SENSe]:CDPower:SSLot:NUMBer
[:SENSe]:CHPower:AVERage:COUNt
[:SENSe]:CHPower:AVERage:COUNt?
[:SENSe]:CHPower:AVERage[:STATe]
[:SENSe]:CHPower:AVERage[:STATe]?
[:SENSe]:CHPower:AVERage:TCONtrol
[:SENSe]:CHPower:AVERage:TCONtrol?
[:SENSe]:CHPower:BANDwidth:INTegration
[:SENSe]:CHPower:BANDwidth:INTegration?
[:SENSe]:CHPower:BANDwidth[:RESolution]
[:SENSe]:CHPower:BANDwidth[:RESolution]?
[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO
[:SENSe]:CHPower:BANDwidth[:RESolution]:AUTO?
[:SENSe]:CHPower:BANDwidth:SHAPe
[:SENSe]:CHPower:BANDwidth:SHAPe?
[:SENSe]:CHPower:BANDwidth:VIDeo
[:SENSe]:CHPower:BANDwidth:VIDeo?
[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO
[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO?
[:SENSe]:CHPower:BWIDth[:RESolution]
[:SENSe]:CHPower:BWIDth:SHAPe
[:SENSe]:CHPower:DETector:AUTO
[:SENSe]:CHPower:DETector:AUTO?
[:SENSe]:CHPower:DETector[:FUNCtion]
[:SENSe]:CHPower:DETector[:FUNCtion]?
[:SENSe]:CHPower:FREQuency:SPAN
[:SENSe]:CHPower:FREQuency:SPAN?
[:SENSe]:CHPower:FREQuency:SPAN:FULL
[:SENSe]:CHPower:FREQuency:SPAN:PREVious
[:SENSe]:CHPower:FREQuency:SYNThesis:AUTO[:STATe]
[:SENSe]:CHPower:FREQuency:SYNThesis:AUTO[:STATe]?
[:SENSe]:CHPower:FREQuency:SYNThesis[:STATe]
[:SENSe]:CHPower:FREQuency:SYNThesis[:STATe]?
[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe]
[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe]?
[:SENSe]:CHPower:IF:GAIN[:STATe]
[:SENSe]:CHPower:IF:GAIN[:STATe]?
[:SENSe]:CHPower:SWEep:POINts
[:SENSe]:CHPower:SWEep:POINts?
[:SENSe]:CHPower:SWEep:TIME
[:SENSe]:CHPower:SWEep:TIME?
[:SENSe]:CHPower:SWEep:TIME:AUTO
[:SENSe]:CHPower:SWEep:TIME:AUTO?
[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes
[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes?
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?
[:SENSe]:CORRection:MS[:RF]:GAIN
[:SENSe]:CORRection:MS[:RF]:GAIN?

```
[:SENSe]:CORRection:MS[:RF]:LOSS
[:SENSe]:CORRection:MS[:RF]:LOSS?
[:SENSe]:CORRection:NOISe:FLOor
[:SENSe]:CORRection:NOISe:FLOor?
[:SENSe]:EBWidth:AVERage:COUNt
[:SENSe]:EBWidth:FREQuency:SPAN
[:SENSe]:EBWidth:MAXHold
[:SENSe]:EBWidth:XDB
[:SENSe]:EVMQpsk:ALPHa
[:SENSe]:EVMQpsk:AVERage:COUNt
[:SENSe]:EVMQpsk:AVERage:COUNt?
[:SENSe]:EVMQpsk:AVERage[:STATe]
[:SENSe]:EVMQpsk:AVERage[:STATe]?
[:SENSe]:EVMQpsk:AVERage:TCONtrol
[:SENSe]:EVMQpsk:AVERage:TCONtrol?
[:SENSe]:EVMQpsk:BANDwidth[:RESolution]
[:SENSe]:EVMQpsk:BANDwidth[:RESolution]?
[:SENSe]:EVMQpsk:BANDwidth:SHAPe
[:SENSe]:EVMQpsk:BANDwidth:SHAPe?
[:SENSe]:EVMQpsk:BWIDth[:RESolution]
[:SENSe]:EVMQpsk:BWIDth:SHAPe
[:SENSe]:EVMQpsk:CRATe
[:SENSe]:EVMQpsk:CRATe?
[:SENSe]:EVMQpsk:FILTer:ALPHa
[:SENSe]:EVMQpsk:FILTer:ALPHa?
[:SENSe]:EVMQpsk:FILTer[:RRC][:STATe]
[:SENSe]:EVMQpsk:FILTer[:RRC][:STATe]?
[:SENSe]:EVMQpsk:IF:GAIN:AUTO[:STATe]
[:SENSe]:EVMQpsk:IF:GAIN:AUTO[:STATe]?
[:SENSe]:EVMQpsk:IF:GAIN[:STATe]
[:SENSe]:EVMQpsk:IF:GAIN[:STATe]?
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[:SENSe]:EVMQpsk:MEAS:LENGth?
[:SENSe]:EVMQpsk:MEAS:OFFSet
[:SENSe]:EVMQpsk:MEAS:OFFSet?
[:SENSe]:EVMQpsk:SPECtrum
[:SENSe]:EVMQpsk:SPECtrum?
[:SENSe]:FEED
[:SENSe]:FEED?
[:SENSe]:FREQuency:CENTer
[:SENSe]:FREQuency:CENTer?
[:SENSe]:FREQuency:CENTer:STEP:AUTO
[:SENSe]:FREQuency:CENTer:STEP:AUTO?
[:SENSe]:FREQuency:CENTer:STEP[:INCRement]
[:SENSe]:FREQuency:CENTer:STEP[:INCRement]?
[:SENSe]:FREQuency:EMIXer:CENTer
[:SENSe]:FREQuency:EMIXer:CENTer?
[:SENSe]:FREQuency:IQ:CENTer
[:SENSe]:FREQuency:IQ:CENTer?
[:SENSe]:FREQuency:RF:CENTer
[:SENSe]:FREQuency:RF:CENTer?
[:SENSe]:MCPower:AVERage:COUNt
[:SENSe]:MCPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]
```

```
[:SENSe]:MCPower:CARRier[1]|2:LIST:BWIDth[:INTegration]
[:SENSe]:MCPower:CARRier[1]|2:LIST:PPResent
[:SENSe]:MCPower:CARRier[1]|2:LIST:WIDTh
[:SENSe]:MCPower:CARRier[1]|2[:POWer]
[:SENSe]:MCPower:FILTer[:RRC]:ALPHa
[:SENSe]:MCPower:FILTer[:RRC][:STATe]
[:SENSe]:MCPower:LIMit[:STATe]
[:SENSe]:MCPower:METHod
[:SENSe]:MCPower:OFFSet[1]|2:LIST:ABSolute
[:SENSe]:MCPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration]
[:SENSe]:MCPower:OFFSet[1]|2:LIST:BWIDth[:INTegration]
[:SENSe]:MCPower:OFFSet[1]|2:LIST[:FREQuency]
[:SENSe]:MCPower:OFFSet[1]|2:LIST:RCARrier
[:SENSe]:MCPower:OFFSet[1]|2:LIST:TEST
[:SENSe]:MCPower:RCARrier[1]|2
[:SENSe]:MONitor:AVERage:COUNt
[:SENSe]:MONitor:AVERage:COUNt?
[:SENSe]:MONitor:AVERage[:STATe]
[:SENSe]:MONitor:AVERage[:STATe]?
[:SENSe]:MONitor:AVERage:TCONtrol
[:SENSe]:MONitor:AVERage:TCONtrol?
[:SENSe]:MONitor:BANDwidth[:RESolution]
[:SENSe]:MONitor:BANDwidth[:RESolution]?
[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO
[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO?
[:SENSe]:MONitor:BANDwidth:VIDeo
[:SENSe]:MONitor:BANDwidth:VIDeo?
[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO
[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO?
[:SENSe]:MONitor:BANDwidth:VIDeo:RATio
[:SENSe]:MONitor:BANDwidth:VIDeo:RATio?
[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO
[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO?
[:SENSe]:MONitor:BWIDth[:RESolution]
[:SENSe]:MONitor:BWIDth:VIDeo
[:SENSe]:MONitor:BWIDth:VIDeo:RATio
[:SENSe]:MONitor:DETector:AUTO
[:SENSe]:MONitor:DETector:AUTO?
[:SENSe]:MONitor:DETector[:FUNCtion]
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[:SENSe]:MONitor:DETector:TRACe?
[:SENSe]:MONitor:FREQuency:SPAN
[:SENSe]:MONitor:FREQuency:SPAN?
[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio
[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio?
[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO
[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO?
[:SENSe]:MONitor:FREQuency:SPAN:BWIDth[:RESolution]:RATio
[:SENSe]:MONitor:FREQuency:SPAN:FULL
[:SENSe]:MONitor:FREQuency:SPAN:PREVious
[:SENSe]:MONitor:SWEep:POINts
[:SENSe]:MONitor:SWEep:POINts?
[:SENSe]:MONitor:SWEep:TIME
```

```
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[:SENSe]:MONitor:SWEep:TIME:AUTO
[:SENSe]:MONitor:SWEep:TIME:AUTO?
[:SENSe]:OBWidth:AVERage:COUNt
[:SENSe]:OBWidth:AVERage:COUNt?
[:SENSe]:OBWidth:AVERage[:STATe]
[:SENSe]:OBWidth:AVERage[:STATe]?
[:SENSe]:OBWidth:AVERage:TCONtrol
[:SENSe]:OBWidth:AVERage:TCONtrol?
[:SENSe]:OBWidth:BANDwidth[:RESolution]
[:SENSe]:OBWidth:BANDwidth[:RESolution]?
[:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO
[:SENSe]:OBWidth:BANDwidth[:RESolution]:AUTO?
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[:SENSe]:OBWidth:BANDwidth:SHAPe?
[:SENSe]:OBWidth:BANDwidth:VIDeo
[:SENSe]:OBWidth:BANDwidth:VIDeo?
[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO
[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO?
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[:SENSe]:OBWidth:BWIDth:SHAPe
[:SENSe]:OBWidth:BWIDth:VIDeo
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[:SENSe]:OBWidth:DETector:AUTO?
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[:SENSe]:OBWidth:FREQuency:SPAN:AUTO?
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[:SENSe]:OBWidth:FREQuency:SPAN:PREVious
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[:SENSe]:OBWidth:PERCent?
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[:SENSe]:OBWidth:SWEep:POINts?
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[:SENSe]:OBWidth:SWEep:TIME?
[:SENSe]:OBWidth:SWEep:TIME:AUTO
[:SENSe]:OBWidth:SWEep:TIME:AUTO?
[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes
[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes?
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[:SENSe]:OBWidth:XDB?
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[:SENSe]:POWer[:RF]:ATTenuation?
[:SENSe]:POWer[:RF]:ATTenuation:AUTO
```

```
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[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement]?
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[:SENSe]:POWer[:RF]:EATTenuation:STATe?
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[:SENSe]:POWer[:RF]:GAIN:BAND?
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[:SENSe]:POWer[:RF]:GAIN[:STATe]?
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[:SENSe]:PSTatistic:BANDwidth
[:SENSe]:PSTatistic:BANDwidth?
[:SENSe]:PSTatistic:BWIDth
[:SENSe]:PSTatistic:COUNts
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[:SENSe]:PSTatistic:SWEep:CYCLes?
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[:SENSe]:PSTatistic:SWEep:TIME?
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[:SENSe]:PVTime:AVERage:COUNt?
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[:SENSe]:PVTime:AVERage:TCONtrol?
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[:SENSe]:PVTime:BANDwidth|BWIDth[:RESolution]:TYPE
[:SENSe]:PVTime:BANDwidth[:RESolution]
[:SENSe]:PVTime:BANDwidth[:RESolution]?
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[:SENSe]:PVTime:BANDwidth:TYPE?
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[:SENSe]:PVTime:BURSt:STHReshold
[:SENSe]:PVTime:BURSt:STHReshold?
[:SENSe]:PVTime:BWIDth[:RESolution]
[:SENSe]:PVTime:IF:GAIN:AUTO
[:SENSe]:PVTime:IF:GAIN:AUTO?
[:SENSe]:PVTime:IF:GAIN[:STATe]
```

```
[:SENSe]:PVTime:IF:GAIN[:STATe]?
[:SENSe]:PVTime:ISLot:FILTering
[:SENSe]:PVTime:ISLot:FILTering?
[:SENSe]:PVTime:ISLot:THReshold
[:SENSe]:PVTime:ISLot:THReshold?
[:SENSe]:PVTime:MASK:LIST:LOWer:RELative
[:SENSe]:PVTime:MASK:LIST:LOWer:RELative?
[:SENSe]:PVTime:MASK:LIST:SWEep:TIME
[:SENSe]:PVTime:MASK:LIST:SWEep:TIME?
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[:SENSe]:PVTime:MASK:LIST:TIME:STARt?
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[:SENSe]:PVTime:MASK:LIST:TIME:STOP?
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[:SENSe]:PVTime:MASK:LIST:UPPer:RELative?
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[:SENSe]:PVTime:MASK:PREFerence?
[:SENSe]:PVTime:MASK:REFerence[:OFFSet]:TIME
[:SENSe]:PVTime:MASK:REFerence[:OFFSet]:TIME?
[:SENSe]:PVTime:MASK:TREFerence
[:SENSe]:PVTime:MASK:TREFerence?
[:SENSe]:PVTime:SLOT[:TYPE]
[:SENSe]:PVTime:SLOT[:TYPE]?
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[:SENSe]:RADio:PLSubtype
[:SENSe]:RADio:PLSubtype?
[:SENSe]:RADio:STANdard:DEVice
[:SENSe]:RADio:STANdard:DEVice?
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[:SENSe]:RHO:ALL[:STATe]
[:SENSe]:RHO:ALPHa
[:SENSe]:RHO:AVERage:COUNt
[:SENSe]:RHO:AVERage:TCONtrol
[:SENSe]:RHO[:BTS]:ACODe
[:SENSe]:RHO[:BTS]:ACODe?
[:SENSe]:RHO[:BTS]:ALL[:STATe]
[:SENSe]:RHO[:BTS]:ALL[:STATe]?
[:SENSe]:RHO[:BTS]:ALPHa
[:SENSe]:RHO[:BTS]:ALPHa?
[:SENSe]:RHO[:BTS]:AVERage:COUNt
[:SENSe]:RHO[:BTS]:AVERage:COUNt?
[:SENSe]:RHO[:BTS]:AVERage[:STATe]
[:SENSe]:RHO[:BTS]:AVERage[:STATe]?
[:SENSe]:RHO[:BTS]:AVERage:TCONtrol
[:SENSe]:RHO[:BTS]:AVERage:TCONtrol?
[:SENSe]:RHO[:BTS]:CAPTure:TIME
[:SENSe]:RHO[:BTS]:CAPTure:TIME?
[:SENSe]:RHO[:BTS]:CRATe
[:SENSe]:RHO[:BTS]:CRATe?
[:SENSe]:RHO[:BTS]:IF:GAIN:AUTO[:STATe]
[:SENSe]:RHO[:BTS]:IF:GAIN:AUTO[:STATe]?
[:SENSe]:RHO[:BTS]:IF:GAIN[:STATe]
[:SENSe]:RHO[:BTS]:IF:GAIN[:STATe]?
```

```
[:SENSe]:RHO[:BTS]:ISLot:THReshold
[:SENSe]:RHO[:BTS]:ISLot:THReshold?
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[:SENSe]:RHO[:BTS]:MACPosition?
[:SENSe]:RHO[:BTS]:MCEStimator
[:SENSe]:RHO[:BTS]:MCEStimator?
[:SENSe]:RHO[:BTS]:MCEStimator:TIMing
[:SENSe]:RHO[:BTS]:MCEStimator:TIMing?
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[:SENSe]:RHO[:BTS]:PNOFfset?
[:SENSe]:RHO[:BTS]:POWer:TYPE
[:SENSe]:RHO[:BTS]:POWer:TYPE?
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[:SENSe]:RHO[:BTS]:PREamble:LENGth?
[:SENSe]:RHO[:BTS]:PREamble:LENGth:AUTO
[:SENSe]:RHO[:BTS]:PREamble:LENGth:AUTO?
[:SENSe]:RHO[:BTS]:PREamble:STATe
[:SENSe]:RHO[:BTS]:PREamble:STATe?
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[:SENSe]:RHO[:BTS]:SLOT:TYPE?
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[:SENSe]:RHO[:BTS]:SSLot:NUMBer?
[:SENSe]:RHO[:BTS]:SSLot[:STATe]
[:SENSe]:RHO[:BTS]:SSLot[:STATe]?
[:SENSe]:RHO:CAPTure:TIME
[:SENSe]:RHO:CRATe
[:SENSe]:RHO:IF:GAIN:AUTO[:STATe]
[:SENSe]:RHO:IF:GAIN[:STATe]
[:SENSe]:RHO:ISLot:THReshold
[:SENSe]:RHO:MCEStimator
[:SENSe]:RHO:MCEStimator:TIMing
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[:SENSe]:RHO:MS:ACODe:ACK?
[:SENSe]:RHO:MS:ACODe:DATA
[:SENSe]:RHO:MS:ACODe:DATA?
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[:SENSe]:RHO:MS:ACODe:DRC?
[:SENSe]:RHO:MS:ACODe:PILot
[:SENSe]:RHO:MS:ACODe:PILot?
[:SENSe]:RHO:MS:ALPHa
[:SENSe]:RHO:MS:ALPHa?
[:SENSe]:RHO:MS:AVERage:COUNt
[:SENSe]:RHO:MS:AVERage:COUNt?
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[:SENSe]:RHO:MS:AVERage:SLOT?
[:SENSe]:RHO:MS:AVERage[:STATe]
[:SENSe]:RHO:MS:AVERage[:STATe]?
[:SENSe]:RHO:MS:AVERage:TCONtrol
[:SENSe]:RHO:MS:AVERage:TCONtrol?
```

```
[:SENSe]:RHO:MS:CRATe
[:SENSe]:RHO:MS:CRATe?
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[:SENSe]:RHO:MS:FERRor:TRANge?
[:SENSe]:RHO:MS:IF:GAIN:AUTO[:STATe]
[:SENSe]:RHO:MS:IF:GAIN:AUTO[:STATe]?
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[:SENSe]:RHO:MS:IF:GAIN[:STATe]?
[:SENSe]:RHO:MS:MCEStimator
[:SENSe]:RHO:MS:MCEStimator?
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[:SENSe]:RHO:MS:MCEStimator:TIMing?
[:SENSe]:RHO:MS:SPECtrum
[:SENSe]:RHO:MS:SPECtrum?
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[:SENSe]:RHO:MS:SSLot:NUMBer?
[:SENSe]:RHO:MS:SSLot[:STATe]
[:SENSe]:RHO:MS:SSLot[:STATe]?
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[:SENSe]:RHO:MS:SYNC?
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[:SENSe]:RHO:MS:SYNC:ILCMask?
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[:SENSe]:RHO:MS:SYNC:QLCMask?
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[:SENSe]:RHO:POWer:TYPE
[:SENSe]:RHO:PREamble:LENGth
[:SENSe]:RHO:PREamble:STATe
[:SENSe]:RHO:SLOT:TYPE
[:SENSe]:RHO:SPECtrum
[:SENSe]:RHO:SSLot:NUMBer
[:SENSe]:SEMask:AVERage:COUNt
[:SENSe]:SEMask:AVERage:COUNt?
[:SENSe]:SEMask:AVERage[:STATe]
[:SENSe]:SEMask:AVERage[:STATe]?
[:SENSe]:SEMask:BANDwidth[1]|2:INTegration
[:SENSe]:SEMask:BANDwidth[1]|2:INTegration?
[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]
[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]?
[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO
[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO?
[:SENSe]:SEMask:BANDwidth:SHAPe
[:SENSe]:SEMask:BANDwidth:SHAPe?
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo?
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:AUTO
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:AUTO?
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO
[:SENSe]:SEMask:BANDwidth[1]|2:VIDeo:RATio:AUTO?
[:SENSe]:SEMask:BWIDth[1]|2[:RESolution]
[:SENSe]:SEMask:BWIDth[1]|2:VIDeo
```

```
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[:SENSe]:SEMask:CARRier:AUTO[:STATe]?
[:SENSe]:SEMask:CARRier:CPSD
[:SENSe]:SEMask:CARRier:CPSD?
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[:SENSe]:SEMask:CARRier[:POWer]?
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[:SENSe]:SEMask:DETector:CARRier:AUTO?
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[:SENSe]:SEMask:DETector:CARRier[:FUNCtion]?
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[:SENSe]:SEMask:DETector:OFFSet:AUTO?
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[:SENSe]:SEMask:DETector:OFFSet[:FUNCtion]?
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[:SENSe]:SEMask:FREQuency[1]|2:SPAN?
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[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth[:RESolution]
[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth:VIDeo
[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep[:TIME]
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[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:IMULti?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:RESolution]:AUTO?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:RATio:AUTO?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STARt
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STARt?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STOP
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STOP?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SIDE
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SIDE?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STARt:ABSolute
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STARt:ABSolute?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STARt:RCARrier
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STARt:RCARrier?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STATe
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STATe?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute:COUPle
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:ABSolute:COUPle?
```

```
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier:COUPle
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STOP:RCARrier:COUPle?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME:AUTO
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SWEep:TIME:AUTO?
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:TEST
[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:TEST?
[:SENSe]:SEMask:OFFSet[1]|2:TYPE
[:SENSe]:SEMask:OFFSet[1]|2:TYPE?
[:SENSe]:SEMask:SWEep[1]|2:TIME
[:SENSe]:SEMask:SWEep[1]|2:TIME?
[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO
[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO?
[:SENSe]:SEMask:TYPE
[:SENSe]:SEMask:TYPE?
[:SENSe]:SPURious:AVERage:COUNt
[:SENSe]:SPURious:AVERage:COUNt?
[:SENSe]:SPURious:AVERage[:STATe]
[:SENSe]:SPURious:AVERage[:STATe]?
[:SENSe]:SPURious:AVERage:TCONtrol
[:SENSe]:SPURious:AVERage:TCONtrol?
[:SENSe]:SPURious:FSMeas
[:SENSe]:SPURious:FSMeas?
[:SENSe]:SPURious:IF:GAIN:AUTO[:STATe]
[:SENSe]:SPURious:IF:GAIN:AUTO[:STATe]?
[:SENSe]:SPURious:IF:GAIN[:STATe]
[:SENSe]:SPURious:IF:GAIN[:STATe]?
[:SENSe]:SPURious:POWer[:RF]:RANGe:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation
[:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation?
[:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:ATTenuation:AUTO?
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]?
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO?
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe?
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo?
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO?
[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth[:RESolution]
[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth:SHAPe
[:SENSe]:SPURious[:RANGe][:LIST]:BWIDth:VIDeo
[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion]
[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion]
[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion]?
[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion]?
[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt
```

```
[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt?
[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP
[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP?
[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion
[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion?
[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold
[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold?
[:SENSe]:SPURious[:RANGe][:LIST]:STATe
[:SENSe]:SPURious[:RANGe][:LIST]:STATe?
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts?
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO?
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME?
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO
[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO?
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[:SENSe]:SPURious:REPT:MODE?
[:SENSe]:SPURious:SPUR
[:SENSe]:SPURious:SPUR?
[:SENSe]:SPURious:TYPE
[:SENSe]:SPURious:TYPE?
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[:SENSe]:STYPe
[:SENSe]:SWEep:EGATe:CONTrol
[:SENSe]:SWEep:EGATe:CONTrol?
[:SENSe]:SWEep:EGATe:DELay
[:SENSe]:SWEep:EGATe:DELay?
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[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel?
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[:SENSe]:SWEep:EGATe:HOLDoff?
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[:SENSe]:SWEep:EGATe:HOLDoff:AUTO?
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[:SENSe]:SWEep:EGATe:MINFast?
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[:SENSe]:SWEep:EGATe:TIME
[:SENSe]:SWEep:EGATe:TIME?
[:SENSe]:SWEep:EGATe:VIEW
[:SENSe]:SWEep:EGATe:VIEW?
[:SENSe]:SWEep:EGATe:VIEW:STARt
[:SENSe]:SWEep:EGATe:VIEW:STARt?
[:SENSe]:SWEep:TIME:GATE:LEVel
```

```
[:SENSe]:SWEep:TIME:GATE:LEVel?
[:SENSe]:TCDPower:ACODe
[:SENSe]:TCDPower:ACODe:ACK
[:SENSe]:TCDPower:ACODe:DATA
[:SENSe]:TCDPower:ACODe:DRC
[:SENSe]:TCDPower:ACODe:PILot
[:SENSe]:TCDPower:CAPTure:TIME
[:SENSe]:TCDPower:CRATe
[:SENSe]:TCDPower:FERRor:TRANge
[:SENSe]:TCDPower:IF:GAIN:AUTO[:STATe]
[:SENSe]:TCDPower:IF:GAIN[:STATe]
[:SENSe]:TCDPower:SPECtrum
[:SENSe]:TCDPower:SSLot:NUMBer
[:SENSe]:TCDPower:SYNC
[:SENSe]:TCDPower:SYNC:ILCMask
[:SENSe]:TCDPower:SYNC:QLCMask
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[:SENSe]:TRHO:ACODe:ACK
[:SENSe]:TRHO:ACODe:DATA
[:SENSe]:TRHO:ACODe:DRC
[:SENSe]:TRHO:ACODe:PILot
[:SENSe]:TRHO:ALPHa
[:SENSe]:TRHO:AVERage:COUNt
[:SENSe]:TRHO:AVERage:SLOT
[:SENSe]:TRHO:AVERage:TCONtrol
[:SENSe]:TRHO:CRATe
[:SENSe]:TRHO:FERRor:TRANge
[:SENSe]:TRHO:IF:GAIN:AUTO[:STATe]
[:SENSe]:TRHO:IF:GAIN[:STATe]
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[:SENSe]:TRHO:MCEStimator:TIMing
[:SENSe]:TRHO:SPECtrum
[:SENSe]:TRHO:SSLot:NUMBer
[:SENSe]:TRHO:SYNC:ILCMask
[:SENSe]:TRHO:SYNC:QLCMask
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[:SENSe]:WAVeform:ADC:DITHer:AUTO[:STATe]?
[:SENSe]:WAVeform:ADC:DITHer[:STATe]
[:SENSe]:WAVeform:ADC:DITHer[:STATe]?
[:SENSe]:WAVeform:APERture?
[:SENSe]:WAVeform:AVERage:COUNt
[:SENSe]:WAVeform:AVERage:COUNt?
[:SENSe]:WAVeform:AVERage[:STATe]
[:SENSe]:WAVeform:AVERage[:STATe]?
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[:SENSe]:WAVeform:AVERage:TACount?
[:SENSe]:WAVeform:AVERage:TCONtrol
[:SENSe]:WAVeform:AVERage:TCONtrol?
[:SENSe]:WAVeform:AVERage:TYPE
[:SENSe]:WAVeform:AVERage:TYPE?
[:SENSe]:WAVeform:AVERage:TYPE:AUTO[:STATe]
[:SENSe]:WAVeform:AVERage:TYPE:AUTO[:STATe]?
[:SENSe]:WAVeform:BANDwidth|BWIDth[:RESolution]:TYPE
```

```
[:SENSe]:WAVeform:BANDwidth[:RESolution]
[:SENSe]:WAVeform:BANDwidth:SHAPe
[:SENSe]:WAVeform:BWIDth[:RESolution]
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[:SENSe]:WAVeform:DIF:BANDwidth
[:SENSe]:WAVeform:DIF:BANDwidth?
[:SENSe]:WAVeform:DIF:FILTer:ALPHa
[:SENSe]:WAVeform:DIF:FILTer:ALPHa?
[:SENSe]:WAVeform:DIF:FILTer:BANDwidth
[:SENSe]:WAVeform:DIF:FILTer:BANDwidth?
[:SENSe]:WAVeform:DIF:FILTer:BANDwidth:AUTO
[:SENSe]:WAVeform:DIF:FILTer:BANDwidth:AUTO?
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[:SENSe]:WAVeform:DIF:FILTer:TYPE
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[:SENSe]:WAVeform:DIF:FILTer:TYPE?
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[:SENSe]:WAVeform:FREQuency:SYNThesis:AUTO[:STATe]?
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[:SENSe]:WAVeform:FREQuency:SYNThesis[:STATe]?
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[:SENSe]:WAVeform:SRATe
[:SENSe]:WAVeform:SRATe?
[:SENSe]:WAVeform:SWEep:TIME
[:SENSe]:WAVeform:SWEep:TIME?
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[:SENSe]:WAVeform:WBIF:FILTer:ALPHa
[:SENSe]:WAVeform:WBIF:FILTer:BANDwidth
[:SENSe]:WAVeform:WBIF:FILTer:BANDwidth?
[:SENSe]:WAVeform:WBIF:FILTer[:TYPE]
[:SENSe]:WAVeform:WBIF:FILTer[:TYPE]?
STATus:OPERation:CONDition?
STATus:OPERation:ENABle
STATus:OPERation:ENABle?
STATus:OPERation[:EVENt]?
STATus:OPERation:NTRansition
STATus:OPERation:NTRansition?
STATus:OPERation:PTRansition
STATus:OPERation:PTRansition?
STATus:PRESet
STATus:QUEStionable:CALibration:CONDition?
STATus:QUEStionable:CALibration:ENABle
STATus:QUEStionable:CALibration:ENABle?
STATus:QUEStionable:CALibration[:EVENt]?
STATus:QUEStionable:CALibration:EXTended:FAILure:CONDition?
STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle
STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle?
```

```
STATus:QUEStionable:CALibration:EXTended:FAILure[:EVENt]?
STATus:QUEStionable:CALibration:EXTended:FAILure:NTRansition
STATus:QUEStionable:CALibration:EXTended:FAILure:NTRansition?
STATus:QUEStionable:CALibration:EXTended:FAILure:PTRansition
STATus:QUEStionable:CALibration:EXTended:FAILure:PTRansition?
STATus:QUEStionable:CALibration:EXTended:NEEDed:CONDition?
STATus:QUEStionable:CALibration:EXTended:NEEDed:ENABle
STATus:QUEStionable:CALibration:EXTended:NEEDed:ENABle?
STATus:QUEStionable:CALibration:EXTended:NEEDed[:EVENt]?
STATus:QUEStionable:CALibration:EXTended:NEEDed:NTRansition
STATus:QUEStionable:CALibration:EXTended:NEEDed:NTRansition?
STATus:QUEStionable:CALibration:EXTended:NEEDed:PTRansition
STATus:QUEStionable:CALibration:EXTended:NEEDed:PTRansition?
STATus:QUEStionable:CALibration:NTRansition
STATus:QUEStionable:CALibration:NTRansition?
STATus:QUEStionable:CALibration:PTRansition
STATus:QUEStionable:CALibration:PTRansition?
STATus:QUEStionable:CALibration:SKIPped:CONDition?
STATus:QUEStionable:CALibration:SKIPped:ENABle
STATus:QUEStionable:CALibration:SKIPped:ENABle?
STATus:QUEStionable:CALibration:SKIPped[:EVENt]?
STATus:QUEStionable:CALibration:SKIPped:NTRansition
STATus:QUEStionable:CALibration:SKIPped:NTRansition?
STATus:QUEStionable:CALibration:SKIPped:PTRansition
STATus:QUEStionable:CALibration:SKIPped:PTRansition?
STATus:QUEStionable:CONDition?
STATus:QUEStionable:ENABle
STATus:QUEStionable:ENABle?
STATus:QUEStionable[:EVENt]?
STATus:QUEStionable:FREQuency:CONDition?
STATus:QUEStionable:FREQuency:ENABle
STATus:QUEStionable:FREQuency:ENABle?
STATus:QUEStionable:FREQuency[:EVENt]?
STATus:QUEStionable:FREQuency:NTRansition
STATus:QUEStionable:FREQuency:NTRansition?
STATus:QUEStionable:FREQuency:PTRansition
STATus:QUEStionable:FREQuency:PTRansition?
STATus:QUEStionable:INTegrity:CONDition?
STATus:QUEStionable:INTegrity:ENABle
STATus:QUEStionable:INTegrity:ENABle?
STATus:QUEStionable:INTegrity[:EVENt]?
STATus:QUEStionable:INTegrity:NTRansition
STATus:QUEStionable:INTegrity:NTRansition?
STATus:QUEStionable:INTegrity:PTRansition
STATus:QUEStionable:INTegrity:PTRansition?
STATus:QUEStionable:INTegrity:SIGNal:CONDition?
STATus:QUEStionable:INTegrity:SIGNal:ENABle
STATus:QUEStionable:INTegrity:SIGNal:ENABle?
STATus:QUEStionable:INTegrity:SIGNal[:EVENt]?
STATus:QUEStionable:INTegrity:SIGNal:NTRansition
STATus:QUEStionable:INTegrity:SIGNal:NTRansition?
STATus:QUEStionable:INTegrity:SIGNal:PTRansition
STATus:QUEStionable:INTegrity:SIGNal:PTRansition?
```

```
STATus:QUEStionable:INTegrity:UNCalibrated:CONDition?
STATus:QUEStionable:INTegrity:UNCalibrated:ENABle
STATus:QUEStionable:INTegrity:UNCalibrated:ENABle?
STATus:QUEStionable:INTegrity:UNCalibrated[:EVENt]?
STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition
STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition?
STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition
STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition?
STATus:QUEStionable:NTRansition
STATus:QUEStionable:NTRansition?
STATus:QUEStionable:POWer:CONDition?
STATus:QUEStionable:POWer:ENABle
STATus:QUEStionable:POWer:ENABle?
STATus:QUEStionable:POWer[:EVENt]?
STATus:QUEStionable:POWer:NTRansition
STATus:QUEStionable:POWer:NTRansition?
STATus:QUEStionable:POWer:PTRansition
STATus:QUEStionable:POWer:PTRansition?>
STATus:QUEStionable:PTRansition
STATus:QUEStionable:PTRansition?
STATus:QUEStionable:TEMPerature:CONDition?
STATus:QUEStionable:TEMPerature:ENABle
STATus:QUEStionable:TEMPerature:ENABle?
STATus:QUEStionable:TEMPerature[:EVENt]?
STATus:QUEStionable:TEMPerature:NTRansition
STATus:QUEStionable:TEMPerature:NTRansition?
STATus:QUEStionable:TEMPerature:PTRansition
STATus:QUEStionable:TEMPerature:PTRansition?
SYSTem:APPLication:CATalog[:NAME]?
SYSTem:APPLication:CATalog[:NAME]:COUNt?
SYSTem:APPLication:CATalog:OPTion?
SYSTem:APPLication:CATalog:REVision?
SYSTem:APPLication[:CURRent][:NAME]?
SYSTem:APPLication[:CURRent]:OPTion?
SYSTem:APPLication[:CURRent]:REVision?
SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle
SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle?
SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTrol?
SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle
SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle
SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?
SYSTem:CONFigure[:SYSTem]?
SYSTem:CSYStem?
SYSTem:DATE
SYSTem:DATE?
SYSTem:DEFault
SYSTem:ERRor[:NEXT]?
SYSTem:ERRor:OVERload[:STATe]
SYSTem:ERRor:VERBose
SYSTem:ERRor:VERBose?
SYSTem:HELP:HEADers?
SYSTem:HID?
```

SYSTem:KLOCk
SYSTem:KLOCk?
SYSTem:LKEY
SYSTem:LKEY?
SYSTem:LKEY:DELete
SYSTem:LKEY:LIST?
SYSTem:OPTions?
SYSTem:PDOWn
SYSTem:PON:MODE
SYSTem:PON:MODE?
SYSTem:PON:TYPE
SYSTem:PON:TYPE
SYSTem:PON:TYPE?
SYSTem:PRESet
SYSTem:PRESet:TYPE
SYSTem:PRESet:TYPE?
SYSTem:PUP:PROCess
SYSTem:SHOW
SYSTem:SHOW?
SYSTem:TIME
SYSTem:TIME?
SYSTem:VERSion?

T

TRACe[1]|2|3:ACPower:DISPlay[:STATe]
TRACe[1]|2|3:ACPower:DISPlay[:STATe]?
TRACe[1]|2|3:ACPower:TYPE
TRACe[1]|2|3:ACPower:TYPE?
TRACe[1]|2|3:ACPower:UPDate[:STATe]
TRACe[1]|2|3:ACPower:UPDate[:STATe]?
TRACe:CHPower:TYPE
TRACe:CHPower:TYPE?
TRACe:MONitor:CLEar
TRACe:MONitor:CLEar:ALL
TRACe[1]|2|3:MONitor:DISPlay[:STATe]
TRACe[1]|2|3:MONitor:DISPlay[:STATe]?
TRACe[1]|2|3:MONitor:TYPE
TRACe[1]|2|3:MONitor:TYPE?
TRACe[1]|2|3:MONitor:UPDate[:STATe]
TRACe[1]|2|3:MONitor:UPDate[:STATe]?
TRACe:OBWidth:TYPE
TRACe:OBWidth:TYPE?
TRACe:SEMask:TYPE
TRACe:SEMask:TYPE?
TRIGger:<measurement>[:SEQuence]:IQ:SOURce
TRIGger:<measurement>[:SEQuence]:IQ:SOURce?
TRIGger:<measurement>[:SEQuence]:RF:SOURce
TRIGger:<measurement>[:SEQuence]:RF:SOURce?
TRIGger:<measurement>[:SEQuence]:SOURce
TRIGger:<measurement>[:SEQuence]:SOURce?

```
TRIGger[:SEQuence]:ATRigger
TRIGger[:SEQuence]:ATRigger?
TRIGger[:SEQuence]:ATRigger:STATe
TRIGger[:SEQuence]:ATRigger:STATe?
TRIGger[:SEQuence]:DELay
TRIGger[:SEQuence]:DELay?
TRIGger[:SEQuence]:DELay:STATe
TRIGger[:SEQuence]:DELay:STATe?
TRIGger[:SEQuence]:EXTernal2:DELay
TRIGger[:SEQuence]:EXTernal:DELay
TRIGger[:SEQuence]:EXTernal1:DELay
TRIGger[:SEQuence]:EXTernal1:DELay?
TRIGger[:SEQuence]:EXTernal2:DELay?
TRIGger[:SEQuence]:EXTernal2:DELay:STATe
TRIGger[:SEQuence]:EXTernal1:DELay:STATe
TRIGger[:SEQuence]:EXTernal1:DELay:STATe?
TRIGger[:SEQuence]:EXTernal2:DELay:STATe?
TRIGger[:SEQuence]:EXTernal2:LEVel
TRIGger[:SEQuence]:EXTernal1:LEVel
TRIGger[:SEQuence]:EXTernal:LEVel
TRIGger[:SEQuence]:EXTernal2:LEVel?
TRIGger[:SEQuence]:EXTernal1:LEVel?
TRIGger[:SEQuence]:EXTernal:SLOPe
TRIGger[:SEQuence]:EXTernal1:SLOPe
TRIGger[:SEQuence]:EXTernal2:SLOPe
TRIGger[:SEQuence]:EXTernal2:SLOPe?
TRIGger[:SEQuence]:EXTernal1:SLOPe?
TRIGger[:SEQuence]:FRAMe:ADJust
TRIGger[:SEQuence]:FRAMe:DELay
TRIGger[:SEQuence]:FRAMe:DELay?
TRIGger[:SEQuence]:FRAMe:DELay:STATe
TRIGger[:SEQuence]:FRAMe:DELay:STATe?
TRIGger[:SEQuence]:FRAMe:EXTernal2:LEVel
TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel
TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe
TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe
TRIGger[:SEQuence]:FRAMe:OFFSet
TRIGger[:SEQuence]:FRAMe:OFFSet?
TRIGger[:SEQuence]:FRAMe:OFFSet:DISPlay:RESet
TRIGger[:SEQuence]:FRAMe:PERiod
TRIGger[:SEQuence]:FRAMe:PERiod?
TRIGger[:SEQuence]:FRAMe:RFBurst:LEVel:ABSolute
TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe
TRIGger[:SEQuence]:FRAMe:SYNC
TRIGger[:SEQuence]:FRAMe:SYNC
TRIGger[:SEQuence]:FRAMe:SYNC?
TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff
TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff?
TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe
TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe?
TRIGger[:SEQuence]:HOLDoff
TRIGger[:SEQuence]:HOLDoff?
TRIGger[:SEQuence]:HOLDoff:STATe
```

TRIGger[:SEQuence]:HOLDoff:STATe?
TRIGger[:SEQuence]:IF:LEVel
TRIGger[:SEQuence]:IF:LEVel?
TRIGger[:SEQuence]:IF:SLOPe
TRIGger[:SEQuence]:IF:SLOPe?
TRIGger[:SEQuence]:LINE:DELay
TRIGger[:SEQuence]:LINE:DELay?
TRIGger[:SEQuence]:LINE:DELay:STATe
TRIGger[:SEQuence]:LINE:DELay:STATe?
TRIGger[:SEQuence]:LINE:SLOPe
TRIGger[:SEQuence]:LINE:SLOPe?
TRIGger[:SEQuence]:OFFSet
TRIGger[:SEQuence]:OFFSet?
TRIGger[:SEQuence]:OFFSet:STATe
TRIGger[:SEQuence]:OFFSet:STATe?
TRIGger[:SEQuence]:RFBurst:DELay
TRIGger[:SEQuence]:RFBurst:DELay?
TRIGger[:SEQuence]:RFBurst:DELay:STATe
TRIGger[:SEQuence]:RFBurst:DELay:STATe?
TRIGger[:SEQuence]:RFBurst:LEVel
TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute
TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?
TRIGger[:SEQuence]:RFBurst:LEVel:RELative
TRIGger[:SEQuence]:RFBurst:LEVel:RELative?
TRIGger[:SEQuence]:RFBurst:LEVel:TYPE
TRIGger[:SEQuence]:RFBurst:LEVel:TYPE?
TRIGger[:SEQuence]:RFBurst:SLOPe
TRIGger[:SEQuence]:RFBurst:SLOPe?
TRIGger[:SEQuence]:SLOPe
TRIGger[:SEQuence]:SLOPe?
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TRIGger[:SEQuence]:VIDeo:DELay
TRIGger[:SEQuence]:VIDeo:DELay?
TRIGger[:SEQuence]:VIDeo:DELay:STATe
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UNIT:ACPower:POWer:PSD
UNIT:ACPower:POWer:PSD?
UNIT:CHPower:POWer:PSD
UNIT:CHPower:POWer:PSD?

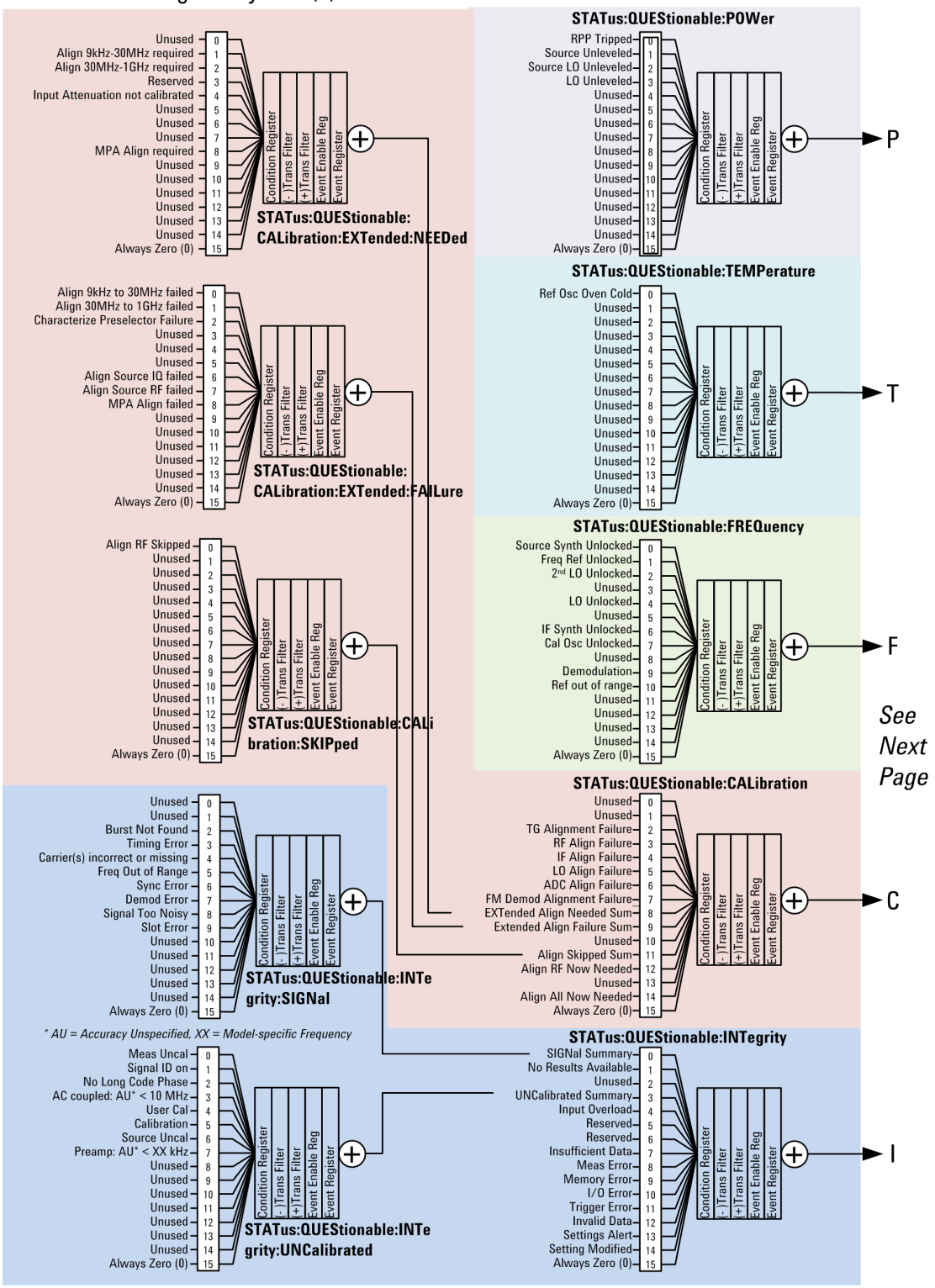
STATus Subsystem

The following diagram provides a graphical overview of the entire X-Series Status Register System.

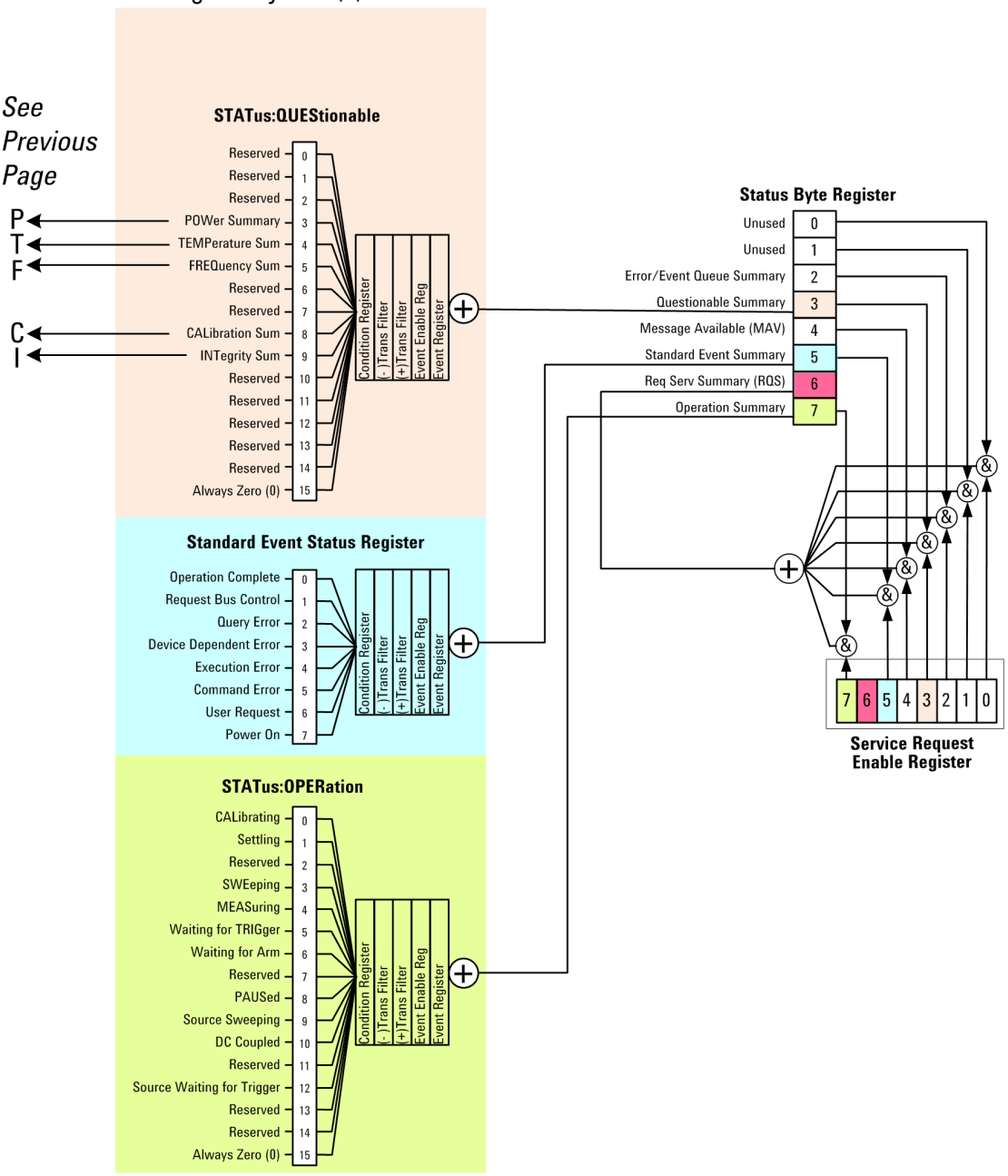
For readability, the diagram is split into two sections:

- "X-Series Status Register System (1) " on page 124
- "X-Series Status Register System (2) " on page 125

X-Series Status Register System (1)



X-Series Status Register System (2)



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).

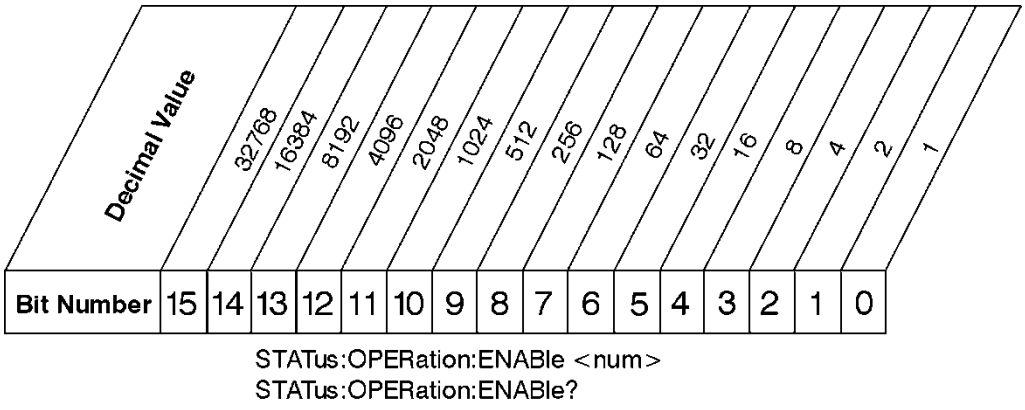
You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the event register is cleared. Querying the event register allows you to detect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



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.

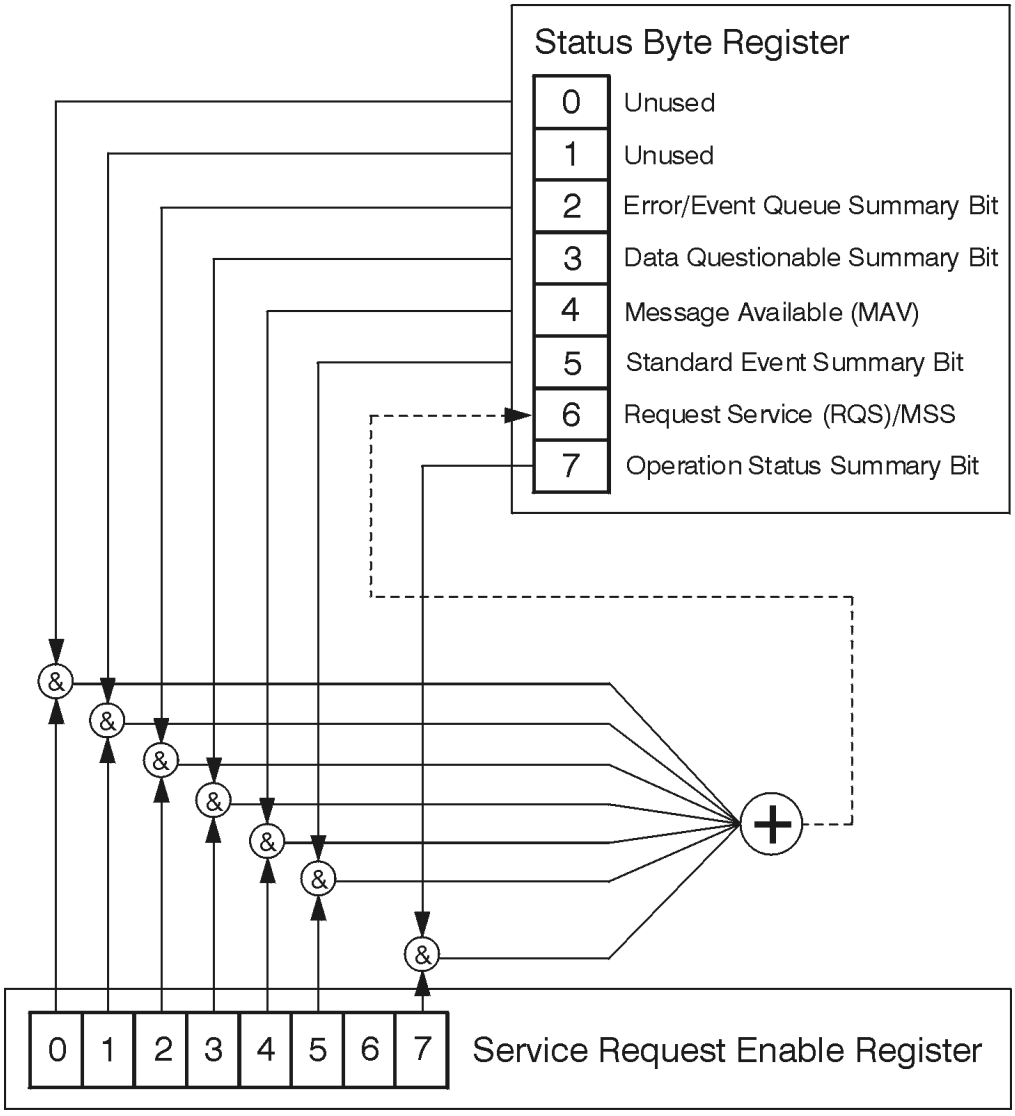
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

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

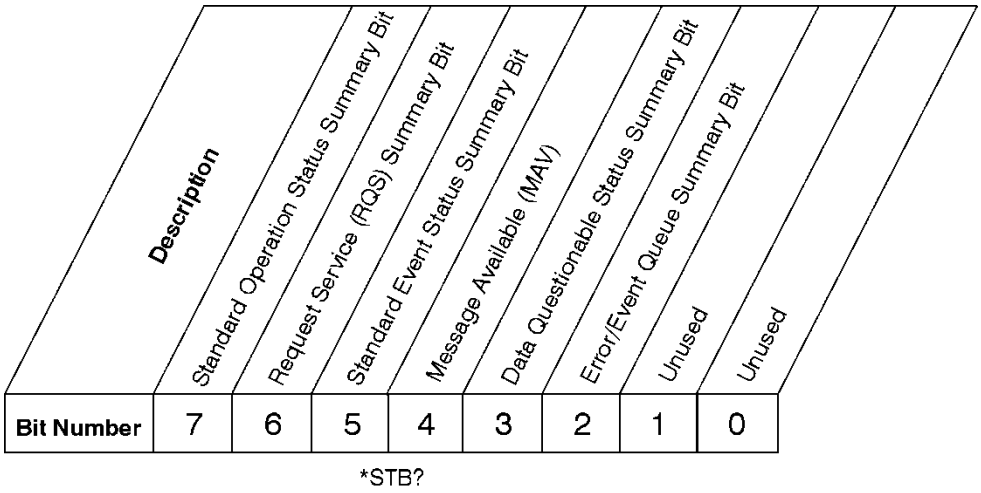
Status Register System

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



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.



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.

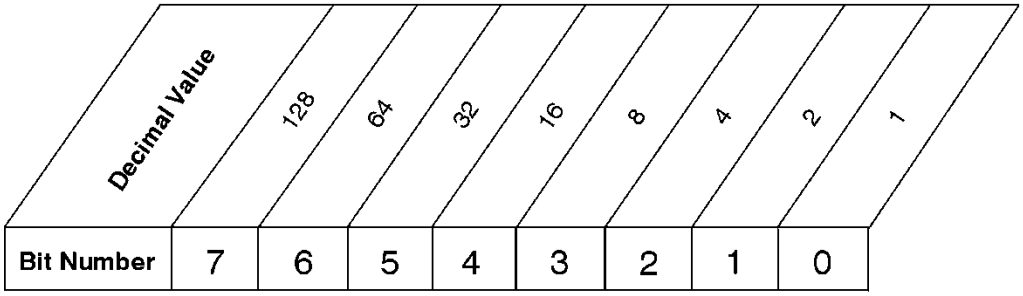
To query the status byte register, send the command *STB? The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The *STB command does not clear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

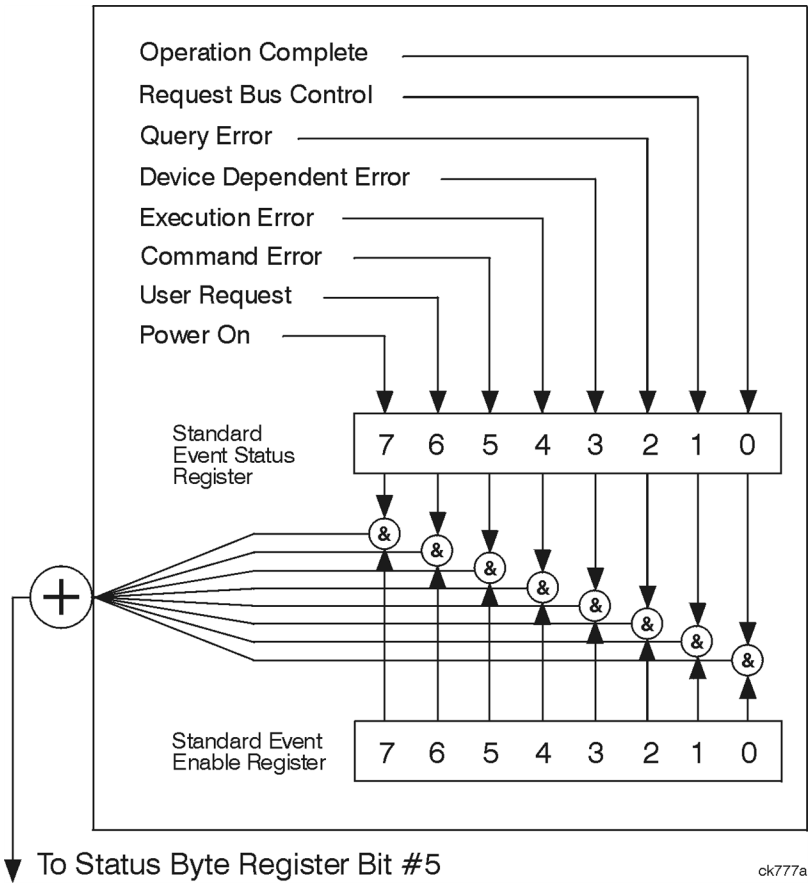
bit 6) to your numeric sum when you enable any bits for a service request. The command *SRE? returns the decimal value of the sum of the bits previously enabled with the *SRE <integer> command.

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



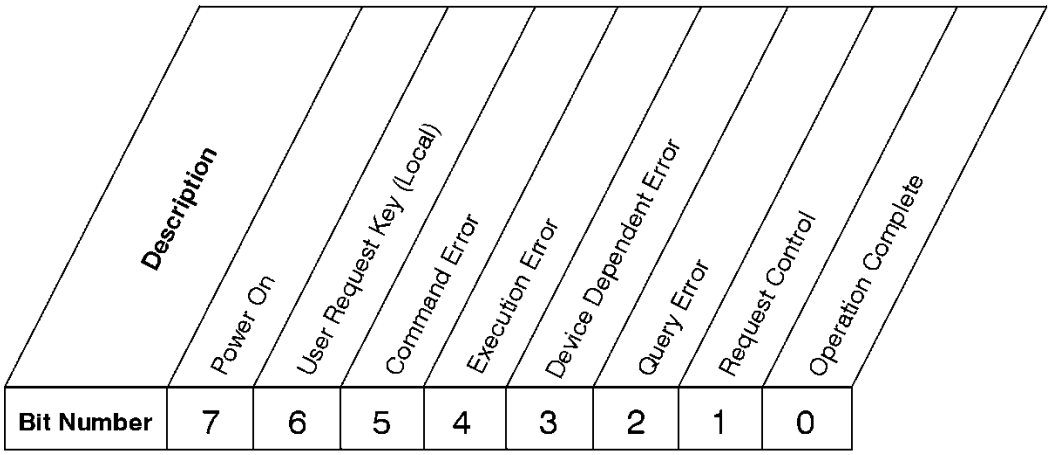
Service Request Enable Register ck726a

Standard Event Status Register



ck777a

The standard event status register contains the following bits:



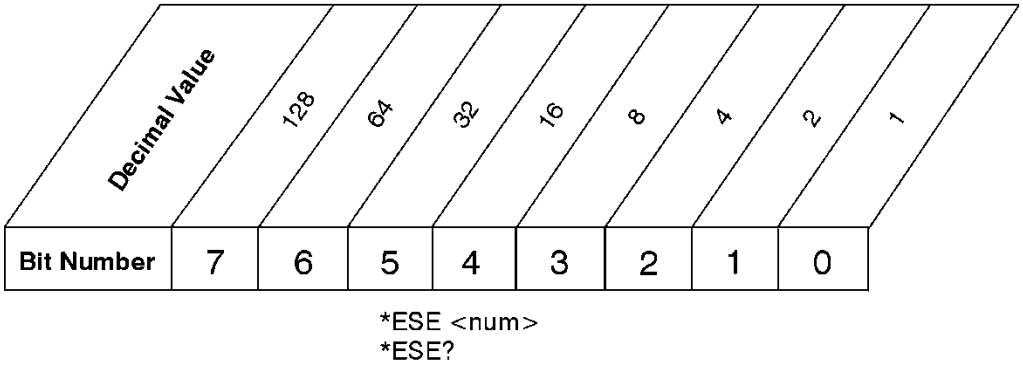
Bit	Description
0	A 1 in this bit position indicates that all pending operations were completed following execution of the *OPC command.
1	This bit is for GPIB handshaking to request control. Currently it is set to 0 because there are no implementations where the spectrum analyzer controls another instrument.
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).



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 unleveled 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 136

"Operation Enable" on page 137

"Operation Event Query" on page 137

"Operation Negative Transition" on page 137

"Operation Positive Transition" on page 138

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

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 141

"Questionable Calibration Enable " on page 141

"Questionable Calibration Event Query " on page 142

"Questionable Calibration Negative Transition " on page 142

"Questionable Calibration Positive Transition " on page 143

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 " on page 143

"Questionable Calibration Skipped Enable " on page 144

"Questionable Calibration Skipped Event Query " on page 144

"Questionable Calibration Skipped Negative Transition " on page 145

"Questionable Calibration Skipped Positive Transition " on page 145

Questionable Calibration Skipped Condition

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

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

Mode	All

Remote Command	`:STATus:QUEStionable:CALibration:SKIPped:CONDition?`
Example	STAT:QUES:CAL:SKIP:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Enable

This command determines which bits in the Questionable Calibration Skipped Condition Register will set bits in the Questionable Calibration Skipped Event register, which also sets bit 11 of the Questionable Calibration 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:SKIPped:ENABle <integer>` `:STATus:QUEStionable:CALibration:SKIPped:ENABle?`
Example	STAT:QUES:CAL:SKIP:ENAB 1 Can be used to query if an EMI alignment skipped condition is detected
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Skipped 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:SKIPped[:EVENt]?`
Example	STAT:QUES:CAL:SKIP?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Negative Transition

This command determines which bits in the Questionable Calibration Skipped Condition register will set the corresponding bit in the Questionable Calibration Skipped 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:SKIPped:NTRansition <integer>` `:STATus:QUEStionable:CALibration:SKIPped:NTRansition?`
Example	STAT:QUES:CAL:SKIP:NTR 1 Align RF skipped 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 Skipped Positive Transition

This command determines which bits in the Questionable Calibration Skipped Condition register will set the corresponding bit in the Questionable Calibration Skipped 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:SKIPped:PTRansition <integer>` `:STATus:QUEStionable:CALibration:SKIPped:PTRansition?`
Example	STAT:QUES:CAL:SKIP:PTR 1 Align RF skipped 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 Extended Failure Register

"Questionable Calibration Extended Failure Condition " on page 146

"Questionable Calibration Extended Failure Enable " on page 146

"Questionable Calibration Extended Failure Event Query " on page 146

"Questionable Calibration Extended Failure Negative Transition " on page 147

"Questionable Calibration Extended Failure Positive Transition " on page 147

Questionable Calibration Extended Failure Condition

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:FAILure:CONDition?`
Example	STAT:QUES:CAL:EXT:FAIL:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Enable

This command determines which bits in the Questionable Calibration Extended Failure Condition Register will set bits in the Questionable Calibration Extended Failure Event register, which also sets bit 9 of the Questionable Calibration 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:EXTended:FAILure:ENABle <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle?`
Example	STAT:QUES:CAL:EXT:FAIL:ENAB 1 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Failure 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:EXTended:FAILure[:EVENt]?`
Example	STAT:QUES:CAL:EXT:FAIL?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Negative Transition

This command determines which bits in the Questionable Calibration Extended Failure Condition register will set the corresponding bit in the Questionable Calibration Extended Failure 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:EXTended:FAILure:NTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:NTRansition?`
Example	STAT:QUES:CAL:EXT:FAIL:NTR 1 EMI conducted align failure 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 Extended Failure Positive Transition

This command determines which bits in the Questionable Calibration Extended Failure Condition register will set the corresponding bit in the Questionable Calibration Extended Failure 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:EXTended:FAILure:PTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:PTRansition?`
Example	STAT:QUES:CAL:EXT:FAIL:PTR 1 EMI conducted align failure 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 Extended Needed Register

Questionable Calibration Extended Needed Condition

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:NEEDed:CONDition?`
Example	STAT:QUES:CAL:EXT:NEED:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Enable

This command determines which bits in the Questionable Calibration Extended Needed Condition Register will set bits in the Questionable Calibration Extended Needed Event register, which also sets bit 14 of the Questionable Calibration 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:EXTended:NEEDed:ENABle <integer>` `:STATus:QUEStionable:CALibration:EXTended:NEEDed:ENABle?`
Example	STAT:QUES:CAL:EXT:NEED:ENAB 2 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
Min	0

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

Questionable Calibration Extended Needed Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Needed 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:EXTended:NEEDed[:EVENt]?`
Example	STAT:QUES:CAL:EXT:NEED?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Negative Transition

This command determines which bits in the Questionable Calibration Extended Needed Condition register will set the corresponding bit in the Questionable Calibration Extended Needed 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:EXTended:NEEDed:NTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:NEEDed:NTRansition?`
Example	STAT:QUES:CAL:EXT:NEED:NTR 2 Align EMI conducted 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 Extended Needed Positive Transition

This command determines which bits in the Questionable Calibration Extended Needed Condition register will set the corresponding bit in the Questionable Calibration Extended Needed 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:EXTended:NEEDed:PTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:NEEDed:PTRansition?`
Example	STAT:QUES:CAL:EXT:NEED:PTR 2 Align EMI conducted is required.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Frequency Register

"Questionable Frequency Condition " on page 150

"Questionable Frequency Enable " on page 151

"Questionable Frequency Event Query " on page 151

"Questionable Frequency Negative Transition " on page 151

"Questionable Frequency Positive Transition " on page 152

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 152

"Questionable Integrity Enable " on page 153

"Questionable Integrity Event Query " on page 153

"Questionable Integrity Negative Transition " on page 154

"Questionable Integrity Positive Transition " on page 154

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

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

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

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

Questionable Integrity Signal Enable

This command determines which bits in the Questionable Integrity Signal Condition Register will set bits in the Questionable Integrity Signal 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:SIGNal:ENABle <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:ENABle?`
Example	STAT:QUES:INT:SIGN:ENAB 4 Burst Not Found 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 Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Signal 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:SIGNal[:EVENt]?`
Example	STAT:QUES:INT:SIGN?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Signal Negative Transition

This command determines which bits in the Questionable Integrity Signal Condition register will set the corresponding bit in the Questionable Integrity Signal 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:SIGNal:NTRansition <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:NTRansition?`
Example	STAT:QUES:INT:SIGN:NTR 4 Burst found 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 Signal Positive Transition

This command determines which bits in the Questionable Integrity Signal Condition register will set the corresponding bit in the Questionable Integrity Signal 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:SIGNal:PTRansition <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:PTRansition?`
Example	STAT:QUES:INT:SIGN:PTR 4 Burst not found 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 Uncalibrated Register

Questionable Integrity Uncalibrated Condition

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

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

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

Questionable Integrity Uncalibrated Enable

This command determines which bits in the Questionable Integrity Uncalibrated Condition Register will set bits in the Questionable Integrity Uncalibrated Event register, which also sets the Data Uncalibrated Summary bit (bit 3) in the Questionable Integrity 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:UNCalibrated:ENABle` `:STATus:QUEStionable:INTegrity:UNCalibrated:ENABle?`
Example	STAT:QUES:INT:UNC:ENAB 1 Oversweep (Meas Uncal) 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 Uncalibrated Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Uncalibrated 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:UNCalibrated[:EVENt]?`
Example	STAT:QUES:INT:UNC?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

Questionable Integrity Uncalibrated Negative Transition

This command determines which bits in the Questionable Integrity Uncalibrated Condition register will set the corresponding bit in the Questionable Integrity Uncalibrated 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:UNCalibrated:NTRansition <integer>` `:STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition?`
Example	STAT:QUES:INT:UNC:NTR 1 Oversweep cleared 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 Uncalibrated Positive Transition

This command determines which bits in the Questionable Integrity Uncalibrated Condition register will set the corresponding bit in the Questionable Integrity Uncalibrated 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:UNCalibrated:PTRansition <integer>` `:STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition?`
Example	STAT:QUES:INT:UNC:PTR 1 Oversweep (Meas Uncal) occurred 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 Power Register

"Questionable Power Condition " on page 159

"Questionable Power Enable " on page 160

"Questionable Power Event Query " on page 160

"Questionable Power Negative Transition " on page 161

"Questionable Power Positive Transition " on page 161

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 162

"Questionable Temperature Enable" on page 162

"Questionable Temperature Event Query" on page 162

"Questionable Temperature Negative Transition" on page 163

"Questionable Temperature Positive Transition" on page 163

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

IEEE 488.2 Common Commands

The instrument supports the following subset of IEEE 488.2 Common Commands, as defined in Chapter 10 of IEEE Standard 488.2–1992. As indicated in the detailed descriptions, some of these commands correspond directly to instrument front-panel key functionality, while others are available only as remote commands.

Command	Description
*CAL?	Align Now "All (Daily use)" on page 254
*CLS	"Clear Status " on page 167
*ESE *ESE?	"Standard Event Status Enable " on page 168
*ESR?	"Standard Event Status Register Query " on page 168
*IDN?	"Identification Query " on page 169
*OPC *OPC?	"Operation Complete " on page 169
*OPT?	"Query Instrument Options " on page 170
*RCL	"Recall Instrument State " on page 171
*RST	"*RST (Remote Command Only)" on page 171
*SAV	"Save Instrument State " on page 172
*SRE *SRE?	"Service Request Enable " on page 172
*STB?	"Status Byte Query " on page 172
*TRG	"Trigger " on page 173
*TST?	"Self Test Query " on page 173
*WAI	"Wait-to-Continue " on page 173

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 EXM/M9420A, 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 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, M9420A, US01020004, M.16.30
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

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 AMPTD Y 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 177

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

Key Path	Front-panel key
Remote Command	`[:SENSe]:FEED RF|AIQ|EMIXer` `[:SENSe]:FEED?`
Example	:FEED RF :FEED?
Couplings	The [:SENSe]:FEED RF 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	`[:SENSe]:FEED AREFerence` In the PSA the calibrator was one of the inputs and selected using the AREF parameter to the same :FEED 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 [:SENSe]:FEED AREFerence command is provided, and is aliased to [SENSe]:FEED:AREF REF50, which causes the input to be switched to the 50 MHz calibrator. The [:SENSe]:FEED RF 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 [:SENSe]:FEED? will NOT return “AREF” but instead the currently selected input.

Backwards Compatibility SCPI	`[:SENSe]:FEED IQ|IONLy|QONLy`
	`[:SENSe]:FEED?`
	The parameters IQ | IONLy | QONLy are supported for backwards compatibility with the E44406A.
	[:SENSe]:FEED IQ aliases to [:SENSe]:FEED: IQ:TYPE IQ
	[:SENSe]:FEED IONLy aliases to [:SENSe]:FEED:IQ:TYPE IONLy

	[:SENSe]:FEED QONLy aliases to [:SENSe]:FEED:IQ:TYPE QONLy The query [:SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ | IONLy | QONLy has been used.
Backwards Compatibility Notes	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. 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). 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. 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.
Initial S/W Revision	Prior to A.02.00

Remote Command	`:INPut:MIXer EXTernal|INTernal` `:INPut:MIXer?`
Example	INP:MIX INT INP:MIX?
Notes	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). For compatibility, the INPut:MIXer EXTernal|INTernal legacy command is mapped as follows: 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	PSA supports the following SCPI Command : :INPut:MIXer:TYPE PRESelected|UNPReselect :INPut:MIXer:TYPE? PXA does not support the :INPut:MIXer:TYPE command.
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 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	`[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50|75` `[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?`
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	`[:SENSe]:FEED:RF:PORT[:INPut] RFIN | RFIN2 | RFIO1 | RFIO2 | RFIO3 | RFIO4 | RFHD | RFFD` `[:SENSe]:FEED:RF:PORT[:INPut]?`
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. RFHD and RFFD are only available on M9420A, option “HDX” is required to enable RFHD port and option “FDX” is required to enable RFFD port.
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	`INPut<1|2>:TYPE INPUT1 | INPUT2`
	`INPut<1|2>:TYPE?`
	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
ReadBack	RF Input
Initial S/W Revision	A.05.01
Modified at S/W Revision	A.14.00

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 181

Key Path	Input/Output, External Gain
Remote Command	`[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:SA[:RF]:GAIN?`
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	`[:SENSe]:CORRection:OFFSet[:MAGNitude]` 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	`[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:MS[:RF]:GAIN?`
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	`[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl>`

	`[:SENSe]:CORRection:MS[:RF]:LOSS?`
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	`[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl>` `[:SENSe]:CORRection:BTS[:RF]:GAIN?`
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	`[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_ampl>` `[:SENSe]:CORRection:BTS[:RF]:LOSS?`
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	INPuts = 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

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.

NOTE:

A common frequency reference module serves all instrument instances, but only one instance of the software application can change the reference input type (INT or EXT or SENSE). The software application allowed to change the reference input is called the controlling instance; by default, the left most instrument instance is the controlling instance. This can be changed in the config file "E66XXModules.config" located under the folder E:\Agilent\Instrument. For the non-controlling instance (s) the reference input types (in SCPI commands, and in the Virtual Front Panel menus) are blanked and unavailable for use.

On M9420A module, there is no internal frequency reference. To work correctly, a 100MHz external frequency reference signal is needed to connect to the front panel of the module. The default Freq Ref In setting is "External" and it cannot be set to any other types.

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. M9420A is only support EXTernal type.
Preset	This is unaffected by a Preset but is set to EXTernal for M9420A or SENSe for other models 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. Note: The status bit is not set for non-controlling instances. To determine if the frequency reference is unlocked, the controlling instance must be queried.
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	`[:SENSe]:ROSCillator:SOURce?`
Notes	The query [SENSe]:ROSCillator:SOURce? returns the current switch setting. This means: 1. If it was set to SENSe but there is no external reference nor 1pps 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” Note: The SCPI query always returns “INTernal” for non-controlling instances. M9420A is only supported EXTernal type.
Preset	All other models: SENSe M9420A: EXTernal
Backwards Compatibility Notes	The query [:SENSe]:ROSCillator:SOURce? 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. In PSA (which had no sensing) the command [:SENSe]:ROSCillator:SOURce set the reference (INT or EXT), so again its query returned the actual routing. Thus the query form of this command is 100% backwards compatible with both instruments.
Initial S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:ROSCillator:SOURce INTernal|EXTernal`
Notes	For PSA compatibility the command form is provided and is directly mapped to [:SENSe]:ROSCillator:SOURce:TYPE Note: The SCPI command does nothing for non-controlling instances.
Initial S/W Revision	Prior to A.02.00

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	`[:SENSe]:ROSCillator:EXTernal:FREQuency <freq>` `[:SENSe]:ROSCillator:EXTernal:FREQuency?`
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"
Min	M9420A:100 MHz
Max	M9420A:100 MHz
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 multiport 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 | RFHD | RFFD` `[:SENSe]:FEED:RF:PORT:OUTPut?`
Example	`:FEED:RF:PORT:OUTP RFIO1`
Dependencies	RFHD and RFFD are only available on M9420A, option “HDX” is required to enable RFHD port and option “FDX” is required to enable RFFD port.
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
ReadBack	RF Output
Initial S/W Revision	A.05.01
Modified at 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 195

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

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 201

Key Path	Front-panel key
Remote Command	`:INSTrument[:SELect] SA | RTSA | SEQAN | EMI | BASIC | WCDMA | EDGEGSM | 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]?`
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: SEQAN
State Saved	Saved in instrument state
Backwards Compatibility SCPI	`:INSTrument[:SELect] GSM` provided forbackwards compatibility. Mapped to EDGEGSM.

Backwards Compatibility SCPI	`:INSTrument[:SELect] SANalyzer`
	provided for ESU compatibility. When this command is received, the analyzer aliases it to the following:
	`INST:SEL SCPILC`
	This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode.

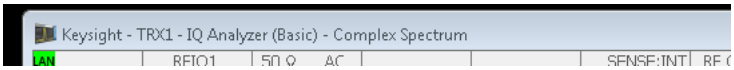
Backwards Compatibility SCPI	`:INSTrument[:SELect] RECeiver`
	provided for ESU compatibility. When this command is received, the analyzer aliases it to the following:
	`:INST:SEL EMI`

	`: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.

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

802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. 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 WIMAXOFDMA INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

Vector Signal Analyzer (VXA)

The N9064A (formerly 89601X) VXA Vector signal and WLAN modulation analysis application provides solutions for basic vector signal analysis, analog demodulation, and digital demodulation. The digital demodulation portion of N9064A allows you to perform measurements on standard-based formats such as cellular, wireless networking and digital video as well as general purpose flexible modulation analysis for wide range of digital formats, FSK to 1024QAM, with easy-to-use measurements and display tools such as constellation and eye diagram, EVM traces and up to four simultaneous displays. Analog baseband analysis is available using the MXA and PXA with option BBA. Option 3FP WLAN has been discontinued.

N9064A honors existing 89601X licenses with all features and functionalities found on X-Series software versions prior to A.06.00. Specifically:

N9064A–1 is equivalent to 89601X–205

N9064A–2 is equivalent to 89601X-AYA

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 VSA INST:NSEL 100
Initial S/W Revision	Prior to A.02.00

Bluetooth

Selects the Bluetooth mode for Bluetooth specific measurements. 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 BT INST:NSEL 228
Initial S/W Revision	A.06.01

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

cdma2000

Selects the cdma2000 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 CDMA2K INST:NSEL 10
Initial S/W Revision	Prior to A.02.00

1xEV-DO

Selects the 1xEV-DO 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 CDMA1XEV INST:NSEL 15
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

LTE-Advanced FDD

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
Initial S/W Revision	A.14.00

LTE-Advanced TDD

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
Initial S/W Revision	A.14.00

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 210 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	123	SEQAN
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSPA+	9	WCDMA
GSM/EDGE/EDGE Evo	13	EDGEGSM
Analog Demod	234	ADEMOD
Bluetooth	228	BTooth
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 208

"Current Application Revision" on page 208

"Current Application Options" on page 208

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 209

"Application Catalog Model Numbers" on page 209

"Application Catalog Revision" on page 209

"Application Catalog Options" on page 210

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.

Note that with the exception of the 89601 VSA, only licensed applications appear in the Mode menu. The 89601 will always appear, because it's licensing is handled differently.

1xEV-DO

Selects the 1xEV-DO 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 CDMA1XEV INST:NSEL 15
Initial S/W Revision	Prior to A.02.00

802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. 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 WIMAXOFDMA INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

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

Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated 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 ADEMOD INST:NSEL 234
Initial S/W Revision	Prior to A.02.00

Bluetooth

Selects the Bluetooth mode for Bluetooth specific measurements. 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 BT INST:NSEL 228
Initial S/W Revision	A.06.01

cdma2000

Selects the cdma2000 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 CDMA2K INST:NSEL 10
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

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
Initial S/W Revision	A.14.00

LTE-Advanced TDD

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
Initial S/W Revision	A.14.00

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

Vector Signal Analyzer (VXA)

The N9064A (formerly 89601X) VXA Vector signal and WLAN modulation analysis application provides solutions for basic vector signal analysis, analog demodulation, and digital demodulation. The digital demodulation portion of N9064A allows you to perform measurements on standard-based formats such as cellular, wireless networking and digital video as well as general purpose flexible modulation analysis for wide range of digital formats, FSK to 1024QAM, with easy-to-use measurements and display tools such as constellation and eye diagram, EVM traces and up to four simultaneous displays. Analog baseband analysis is available using the MXA and PXA with option BBA. Option 3FP WLAN has been discontinued.

N9064A honors existing 89601X licenses with all features and functionalities found on X-Series software versions prior to A.06.00. Specifically:

N9064A–1 is equivalent to 89601X–205

N9064A–2 is equivalent to 89601X-AYA

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 VSA INST:NSEL 100
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 will be in effect for all measurements in the current mode.

Key Path	Front Panel
Initial S/W Revision	Prior to A.02.00

Radio

This key accesses a menu to allow you to select the device.

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

Device

Allows you to specify the device to be used.

Key Path	Mode Setup, Radio
Mode	1xEVDO
Remote Command	`[:SENSe]:RADio:STANdard:DEVice BTS|MS` `[:SENSe]:RADio:STANdard:DEVice?`
Example	:RAD:STAN:DEV BTS :RAD:STAN:DEV?
Notes	In the 1xEV-DO mode, Radio device BTS is called Forward Link and MS is called Reverse Link
Preset	BTS
State Saved	Saved in instrument state.
Range	BTS | MS
Backwards Compatibility SCPI	`[:SENSe]:RADio:DEVice`
Initial S/W Revision	Prior to A.02.00

Pre-defined Offset/Interval

Accesses a menu that enables you to select one of the following slot types:

Idle slot #1 – The active burst in first half idle slot.

Idle slot #2 – The active burst in second half idle slot.

Half slot #1 – The first half slot.

Half slot #2 – The second half slot

Pilot #1 – The first pilot slot.

Pilot #2 – The second pilot slot.

MAC #1 – The first MAC slot.

MAC #2 – The second MAC slot.

MAC #3 – The third MAC slot.

MAC #4 – The fourth MAC slot.

Full slot – The whole slot.

By couple, user can indirectly set the delay and length of Gate.

Key Path	Mode Setup, Radio
Mode	1xEVDO
Remote Command	`[:SENSe]:STYPe IS1 | IS2 | HS1 | HS2 | PIL1 | PIL2 | MAC1 | MAC2 | MAC3 | MAC4 | FS` `[:SENSe]:STYPe ?`
Example	:STYPe HS1 :TYPE?
Preset	IS1
State Saved	Saved in instrument state.
Range	IdleSlot 1 | IdleSlot 2 | HalfSlot 1 | HalfSlot 2 | Pilot1 | Pilot2 | MAC1 | MAC2 | MAC3 | MAC4 | FullSlot
Initial S/W Revision	Prior to A.02.00

Demod

This key accesses a menu to allow you to select the pre-defined offset/interval.

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

Physical Layer Subtype

Allows you to select the subtype used in measurement.

Key Path	Mode Setup, Demod
Mode	1xEVDO
Remote Command	`[:SENSe]:RADio:PLSubtype SUB0|SUB2|SUB3` `[:SENSe]:RADio:PLSubtype?`
Example	:RADio:PLSubtype SUB0

	:RADio:PLSubtype?
Notes	For reverse link, Subtype3 only supports No Feedback Mux mode. In the 1xEV-DO mode, sub0/1 type indicates the revision 0 of protocol, sub2 indicates revision A, and sub3 indicates revision B.
Couplings	For the measurements Mod Accuracy and Code Domain measurements, the "Predefined Active Chan" menu under the Meas Setup menu is not the same depending on the Physical Layer Subtype selected here.
Preset	SUB0
State Saved	Saved in instrument state.
Range	Subtype 0/1 | Subtype 2 | Subtype 3
Initial S/W Revision	Prior to A.02.00

Restore Mode Defaults

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

Please refer to "Restore Mode Defaults (All Modes)" on page 277 for details.

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

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

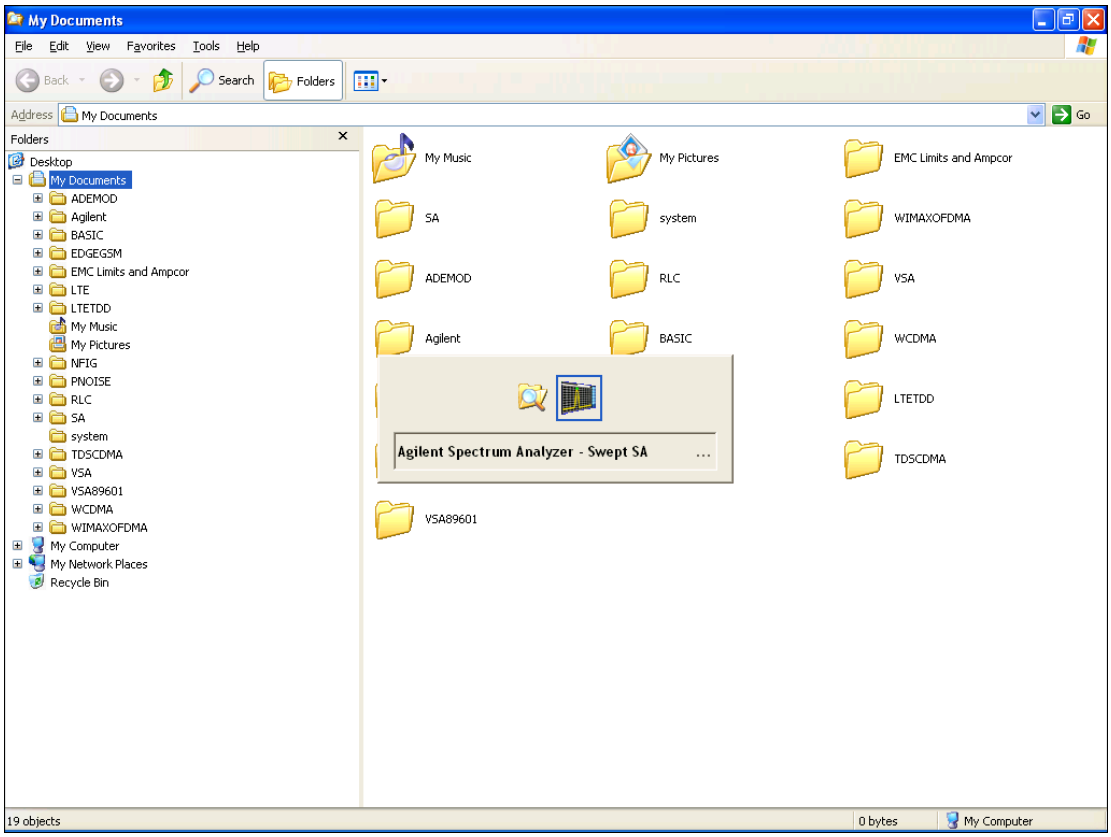
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

File Explorer

Opens the standard Windows File Explorer. The File Explorer opensin 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 Menu (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.

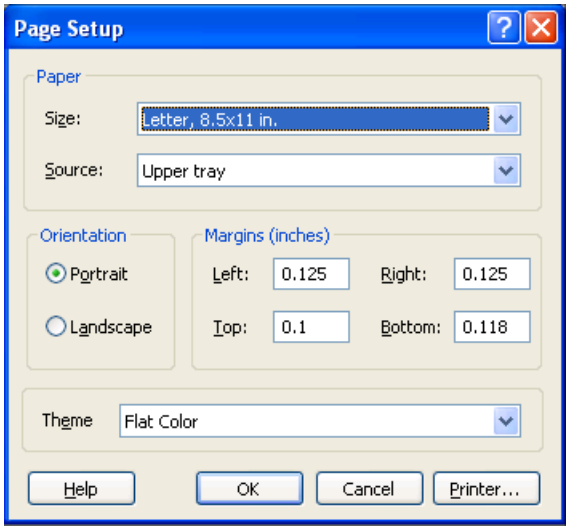
Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

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

Minimize

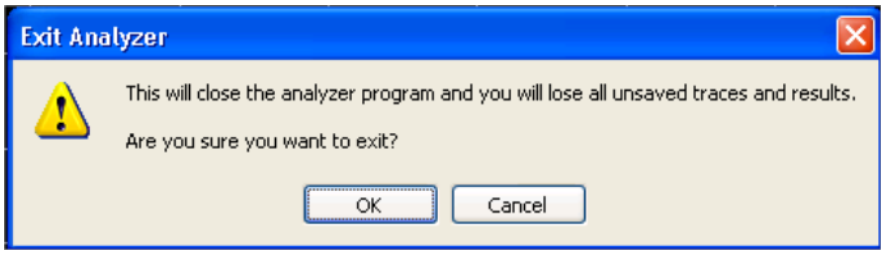
The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see the Windows Desktop. You can use Alt-Tab (press and hold the Alt 

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 willclose. 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 232.

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 232.

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

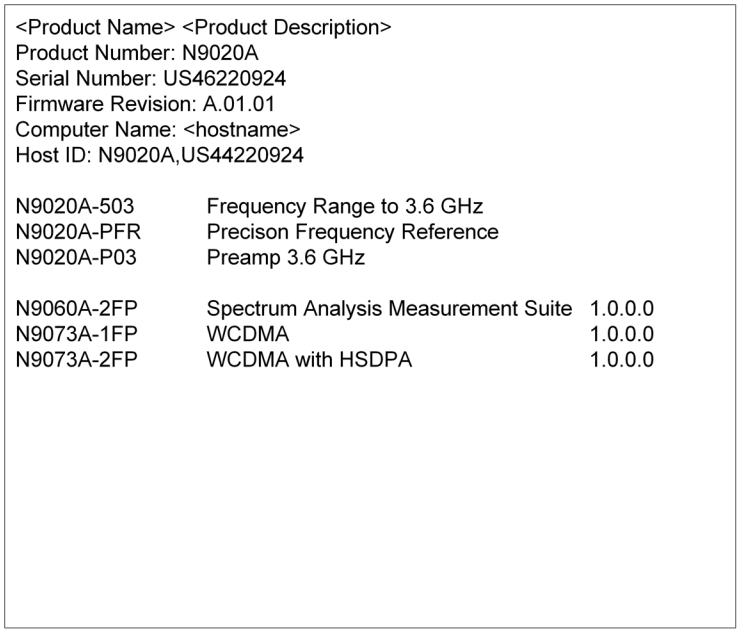
Power Up (Remote Command Only)

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:



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)

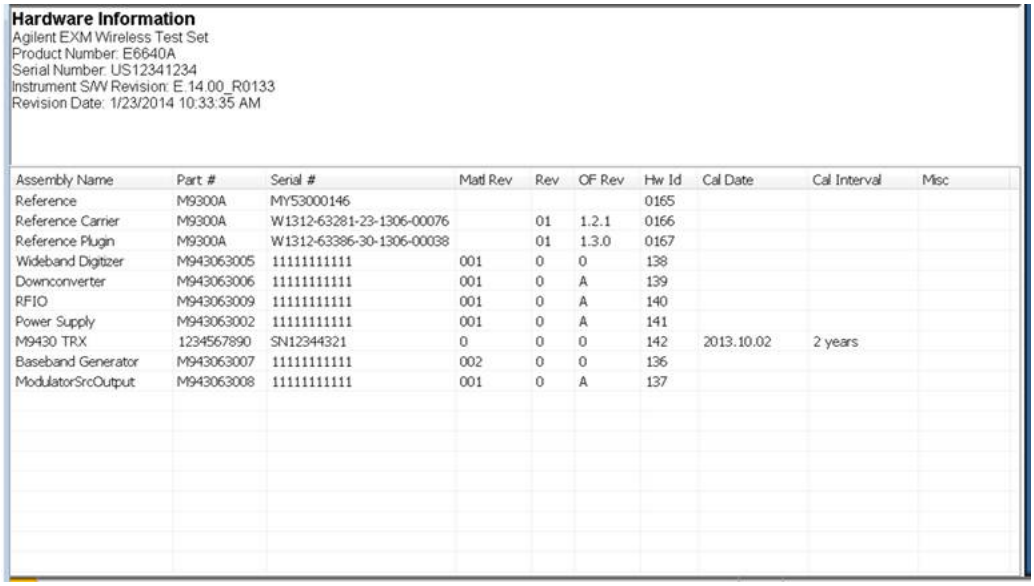
A remote command is available to obtain the Computer System description. The Computer System is the operating system and patch level as reported by operating system.

Remote Command	`:SYSTem:CSYStem?`
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

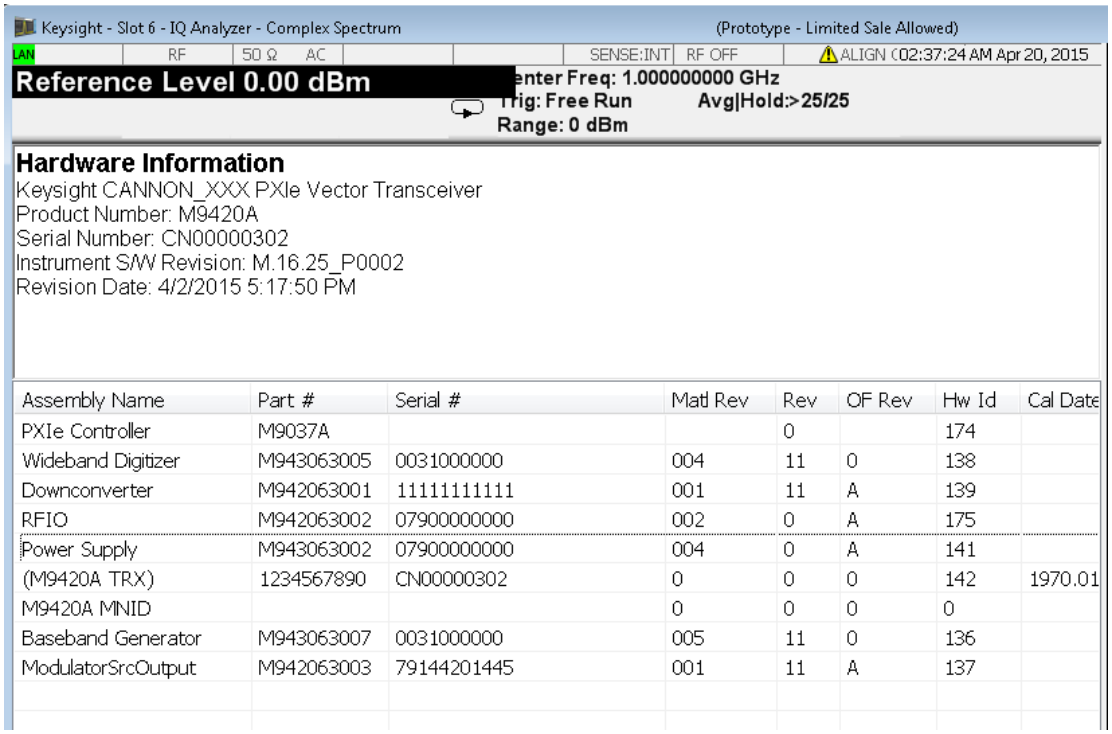
Hardware

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:



M9420A:



Assembly Name	Part #	Serial #	Matl Rev	Rev	OF Rev	Hw Id	Cal Date
PXIe Controller	M9037A			0		174	
Wideband Digitizer	M943063005	0031000000	004	11	0	138	
Downconverter	M942063001	11111111111	001	11	A	139	
RFIO	M942063002	07900000000	002	0	A	175	
Power Supply	M943063002	07900000000	004	0	A	141	
(M9420A TRX)	1234567890	CN00000302	0	0	0	142	1970.01
M9420A MNID			0	0	0	0	
Baseband Generator	M943063007	0031000000	005	11	0	136	
ModulatorSrcOutput	M942063003	79144201445	001	11	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 is 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 238

"System Log Off (Remote Command Only)" on page 238

"List installed Options (Remote Command Only)" on page 238

"Lock the Front-panel keys (Remote Command Only)" on page 238

"Front Panel activity history (Remote Command only)" on page 239

"SCPI Version Query (Remote Command Only)" on page 241

"Date (Remote Command Only)" on page 241

"Time (Remote Command Only)" on page 241

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.

System Log Off (Remote Command Only)

This SCPI command provides a means to terminate all open Windows applications and log off the current user. This is equivalent to performing the Windows command "shutdown –l –f –t0".

Remote Command	`SYSTem:LOFF`
Example	SYST:LOFF
Notes	Initiates an immediate log off of the current user. This exits the instrument application, thus any unsaved measurement result will be lost. You cannot use *WAI or *OPC? to synchronize operation. In addition to the instrument application, all other Windows programs will be terminated without the opportunity to save any work in progress. The instrument will require human interaction to perform a Log In to regain instrument operation.
Initial S/W Revision	A.14.50

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

Front Panel activity history (Remote Command only)

Instrument front panel usage can be monitored with the query :SYSTem:METRics:FPANel?. The monitoring occurs for front panel Hardkey or Softkey operation (not mouse or touch operation on instruments with Multi-Touch User Interface). The information of the usage pertains to the activity since the instrument application was started; the information does not persist after the application is terminated, or the instrument has been rebooted.

To prevent the front panel from being placed into Remote the monitoring must occur via an I/O protocol such as LAN Socket, or the remote program performing the monitoring must explicitly place the instrument into Local after the query has been performed.

Remote Command	`:SYSTem:METRics:FPANel?`
Example	SYST:METR:FPAN?
Notes	The return value is a string with the format "YYYY-MM-DD<space>HH:MM:SS", in instrument local time. If no front panel activity has occurred since the instrument was booted (instrument application started), the return value will be the time the instrument application started. The instrument application start time can be obtained with the query SYSTem:METRics:STIMe?
Initial S/W Revision	x.16.10

SCPI activity history (Remote Command only)

Instrument remote operation usage via SCPI can be monitored with the query :SYSTem:METRics:SCPI?. The monitoring occurs for SCPI control from any I/O channel (GPIB, USB, or LAN). The information of the usage pertains to the activity since the instrument application was started; the information does not persist after the application is terminated, or the instrument has been rebooted.

Remote Command	`:SYSTem:METRics:SCPI?`
Example	:SYST:METR:SCPI?
Notes	The return value is a string with the format "YYYY-MM-DD<space>HH:MM:SS", in instrument local time. The following commands are excluded from the history accounting: *IDN? *OPT? :SYSTem:DATE? :SYSTem:TIME? :SYSTem:PON:TIME? Queries in the :SYSTem:ERRor subsystem Queries in the :SYSTem:LKEY subsystem Queries in the :SYSTem:METRics subsystem Queries in the :SYSTem:MODule subsystem If no SCPI activity has occurred since the instrument was booted (instrument application started), the return value will be the time the instrument application started. The instrument application start time can be obtained with the query SYSTem:METRics:STIMe?
Initial S/W Revision	x.16.10

Instrument start time (Remote Command only)

To determine if instrument activity has occurred the SCPI query :SYSTem:METRics:STIMe? can be used to determine the instrument application start time.

Remote Command	`:SYSTem:METRics:STIMe?`
Example	:SYST:METR:STIM?
Notes	The return value is a string with the format "YYYY-MM-DD<space>HH:MM:SS", in instrument local time.
Initial S/W Revision	x.16.10

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	The Display Name of the module will be returned. The Display name shows the location of the module with which the application is running. Display name uses format of "Chassis <number> - Slot <number>". If there is only one chassis is used, "Chassis <number> - "will be ignored, the display name will become "Slot <number>".
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 ("hlislip#").

Mode	All
Remote Command	`:SYSTem:MODule:INDex?`
Example	:SYST:MOD:IND?
Notes	The returned value is meaningless on M9420A.3.
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: M9290A_US00000001,Slot 1,Enabled,0,5023,5025,3574 M9290A_US00000002,Slot 5,Enabled,1,5123,5125,3575 M9290A_US00000003,Slot 11,Enabled,2,5223,5225,3576 M9290A_US00000004,Slot 15,Enabled,3,5323,5325,3577
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? "M9290A_US00000001"

<<1

SCPI>>syst:mod:enab? "M9290A_US00000002"

<<0

SCPI>>syst:err?

<<+0,"No error"

SCPI>>syst:mod:enab "M9290A_US00000001",0

SCPI>>syst:err?

<<–221,"Settings conflict;Cannot disable default process configuration 'M9290A_US00000001"

Mode	All
Remote Command	`:SYSTem:MODule:ENABle? "<mnemonic>"` `:SYSTem:MODule:ENABle "<mnemonic>",0|1`
Example	:SYST:MOD:ENAB? "M9290A_US00000001" :SYST:MOD:ENAB "M9290A_US00000001",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 confutation.

Example:

SCPI>>syst:mod:def?

<<" M9290A_US00000001"

SCPI>>syst:mod:enab "M9290A_US00000002",0

SCPI>>syst:mod:enab? "M9290A_US00000002"

<<0

SCPI>>syst:mod:def "M9290A_US00000002"

SCPI>>syst:mod:enab? "M9290A_US00000002"

<<1

SCPI>>syst:mod:def?

<<" M9290A_US00000002"

Mode	All
Remote Command	`:SYSTem:MODule:DEFault?`

	:SYSTem:MODule:DEFault "<mnemonic>"
Example	:SYST:MOD:DEF? :SYST:MOD:DEF "M9290A_US0000001"
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:MODel?
Example	:SYSTem:MODule:MODel?
Notes	This query will return model number. e.g. "M9420A"
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.

NOTE In products that run multiple instances of the X-Series Application, the same Power On type is shared between all the instances.

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 In products that run multiple instances of the X-Series Application, the same User Preset is shared between all the instances.

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

In products that run multiple instances of the X-Series Application, each instance has a unique Last State.

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.

NOTE In products that run multiple instances of the X-Series Application, the same Power On Application is shared between all the instances.

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: SEQAN
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.

NOTE In products that run multiple instances of the X-Series Application, the same Configure Applications Utility is shared between all the instances.

For more information, see the following topics:

"Preloading Applications" on page 249

"Access to Configure Applications utility" on page 249

"Virtual memory usage" on page 249

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

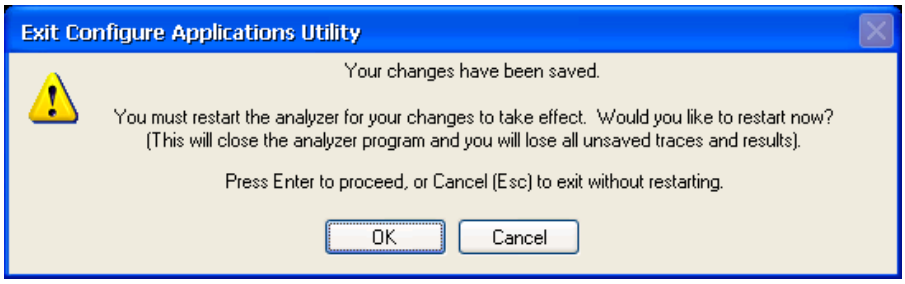
Toggles the currently highlighted application in the list.

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

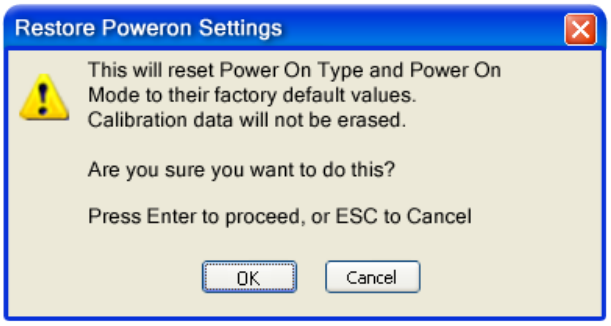
Pressing this key will exit the Configure Applications utility without saving your changes.

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 programa 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.

NOTE **In products that run multiple instances of the X-Series Application, the same Configure Applications Utility launched from the Windows Desktop will apply to all the instances.**

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 253
- "Configuration Memory Available (Remote Command Only)" on page 253

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 EXM/M9420A, 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 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 EXM/M9420A, 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 EXM/M9420A, 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 :ABORt command. 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. A failure encountered during alignment will generate the Error Condition message "Align RF failed" and set bit 3 in the Status Questionable Calibration register. 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. 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, RF Time. 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	`:CALibration:RF:NPENding`
Example	CAL:RF:NPEN
Notes	: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. Typical usage is: 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

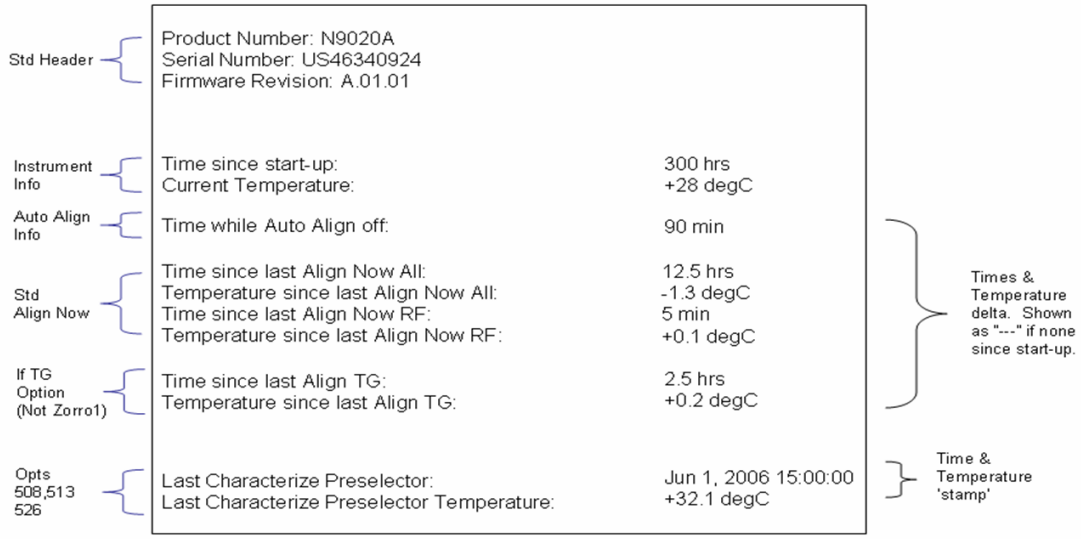
	completed or not. Typical usage is: 1):CALibration:INTernal:SOURce:NPENding (start an internal source calibration) 2):STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit 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

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

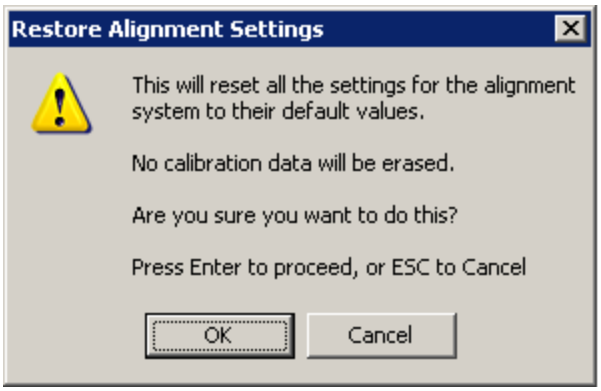
Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	`:CALibration:TIME:SOURce:LALL?`
Example	:CAL:TIME:SOUR:LALL?
Notes	Value is the date and time of the last successful Align Now, Source was performed on the instrument.
State Saved	No
Initial S/W Revision	A.05.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
Remote Command	`:CALibration:TEMPerature:SOURce: LALL?`
Example	:CAL:TEMP:SOUR:LALL?
Notes	Value is in degrees Centigrade at which the last successful Align Now, Sourcewas performed on the instrument.
State Saved	No
Initial S/W Revision	A.05.00

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.

NOTE By default settings: Telnet port 5023, socket port 5025, SICL server 0 and HiSLIP server 0 will be assigned to first instance; Telnet port 5123, socket port 5125, SICL server 1 and HiSLIP server 1 will be assigned to second instance; Telnet port 5223, socket port 5225, SICL server 2 and HiSLIP server 2 will be assigned to third instance; Telnet port 5323, socket port 5325, SICL server 3 and HiSLIP server 3 will be assigned to the fourth instance.

The Telnet port, socket port, physics port and HiSLIP server can also be set on the LaunchModularSA tool Setting panel.

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	• 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,M9420A,MY00012345, E.14.50"

where the fields are manufacturer, model number, serial number, firmware revision.

Note: In products that run multiple instances of the X-Series Application, all instances use the same factory System IDN response.

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.

Note: In products that run multiple instances of the X-Series Application, all instances use the same User System IDN response.

Key Path	System, I/O Config, IDN Response
Example	:SYST: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	• 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

Lock Remote I/O Session (Remote Command only)

You can lock the SCPI control of the instrument to the I/O Interface and Session by performing a SYSTem:LOCK:REQuest? Query. This permits cooperative sharing of the instrument between multiple computers, or multiple sessions from the same computer.

NOTE Use of cooperative sharing (locking) must take into account the properties of an interface, interfaces are either single session or multiple session:

NOTE	Interface	NOTE	Single Session	NOTE	Multiple Session
NOTE	GPIB	NOTE	✓	NOTE	
NOTE	USB-488	NOTE	✓	NOTE	
NOTE	LANVXI-11 (SICL)	NOTE	✓	NOTE	
NOTE	LANSocket	NOTE		NOTE	✓

NOTE	LAN HiSLIP	NOTE	NOTE	✓
NOTE	LAN Telnet	NOTE	NOTE	✓

NOTE It is inappropriate to control the instrument from multiple computers (or multiple processes or threads of a single computer) when using single session interfaces. In particular, care must be taken when using LAN VXI–11 (SICL) interface that only a single computer (or single process or single thread) is controlling the instrument; if multiple computers are controlling the instrument responses may not result in expected operation.

It is not recommend to use VXI–11 with SCPI locking as multiple clients can simultaneously connect to the instrument. If VXI–11 is required then VISA locking must be used in addition to SCPI locking.

The recommended interface is LAN HiSLIP. Since HiSLIP is a multiple session interface, the controlling computer can send lock requests from multiple applications (or multiple threads of a single application) to permit cooperative sharing of the instrument.

Remote Command	`SYSTem:LOCK:REQuest?`
Example	SYST:LOCK:REQ?
Notes	The command returns a 1 if the lock request is granted, 0 is returned if the request is denied. Single Session interfaces will always return 1 once the same interface has already received a lock request. Lock requests on an individual interface and session can be nested and each request will increase an internal lock count by 1. For every granted request, you will need to perform a SYSTem:LOCK:RELease to decrement the internal lock count to fully relinquish the lock. When the instrument is locked bit 0 is set in the Operation Instrument status register. Disconnecting the individual interface and session will release the lock if the lock is granted to the interface and session. A Device Clear over any interface and session will release the lock, regardless of the interface and session which obtained the lock.

	The following queries are permitted over any interface and session even if an interface has the instrument locked: *IDN? *OPT? *STB? *ESR? :SYSTem:DATE? :SYSTem:TIME? :SYSTem:PON:TIME? Queries in the :STATus subsystem Queries in the :SYSTem:ERRor subsystem Queries in the :SYSTem:LKEY subsystem Queries in the :SYSTem:LOCK subsystem Queries in the :SYSTem:METRics subsystem Queries in the :SYSTem:MODule subsystem All other commands and queries will result in the error: –203,"Command protected; Instrument locked by another I/O session"
State Saved	Not part of Save/Recall
Initial S/W Revision	x.16.10

Unlock Remote I/O Session (Remote Command only)

You can unlock the SCPI control of an I/O Interface and Session performing a SYSTem:LOCK:RELease command. Lock requests on an individual interface and session can be nested and each request will increase an internal lock count by 1. For every granted request, you will need to perform a release. The lock is not relinquished until the internal lock count is at 0.

Remote Command	SYSTem:LOCK:RELease
Example	SYST:LOCK:REL
Notes	When the instrument is unlocked bit 0 is cleared in the Operation Instrument status register.
Initial S/W Revision	x.16.10

Remote I/O Session Lock Name (Remote Command only)

You can determine the I/O Interface and Session name of the currently running program with the query SYSTem:LOCK:NAME?.

Remote Command	SYSTem:LOCK:NAME?
Example	SYST:LOCK:NAME?
Notes	The information returned is a string of the format: "<I/O Interface>[/<IP address>/<Session ID>]" Where IP address and Session ID are only provided for interfaces that provide multiple sessions.

	Single Session interfaces (GPIB, USB–488, and LAN VXI–11) only list interface name. The Session ID is an internally generated identifier, it is not guaranteed to be consistent across instrument software versions (the identifier is free to change when the software of the instrument is updated). The absolute value of the Session ID is not significant, the identifier will be consistent for a given software version and can be relied upon for lock owner logic comparisons.
Initial S/W Revision	x.16.10

Remote I/O Session Lock Owner (Remote Command only)

You can determine which I/O Interface and Session has the SCPI locked with the query SYSTem:LOCK:OWNer?. If no interface and session has the SCPI locked "NONE" is returned.

Remote Command	SYSTem:LOCK:OWNer?
Example	SYST:LOCK:OWN?
Notes	The information returned is a string of the format: "<I/O Interface>[/<IP address>/<Session ID>]" Where IP address and Session ID are only provided for interfaces that provide multiple sessions. Single Session interfaces (GPIB, USB–488, and LAN VXI–11) only list interface name. The Session ID is an internally generated identifier, it is not guaranteed to be consistent across instrument software versions (the identifier is free to change when the software of the instrument is updated). The absolute value of the Session ID is not significant, the identifier will be consistent for a given software version and can be relied upon for lock owner logic comparisons. If no interface and session have the SCPI locked the return value is "NONE".
Initial S/W Revision	x.16.10

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.

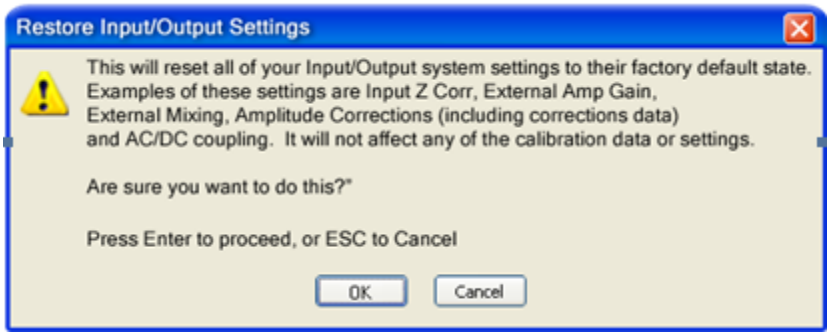
NOTE In products that run multiple instances of the X-Series Application, all insances have the same factory default states for Restore Defaults.

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:

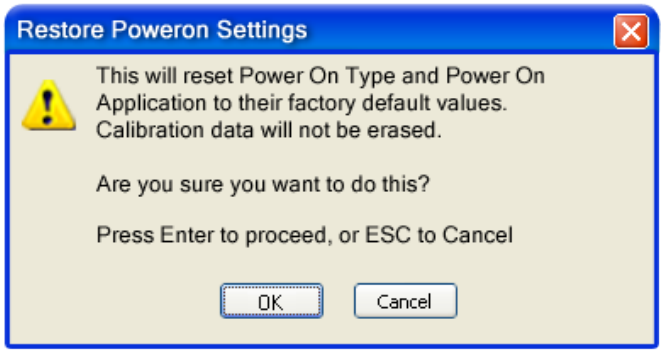


Key Path	System, Restore System Defaults
Example	:SYST:DEF INP
Initial S/W Revision	Prior to A.02.00

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:



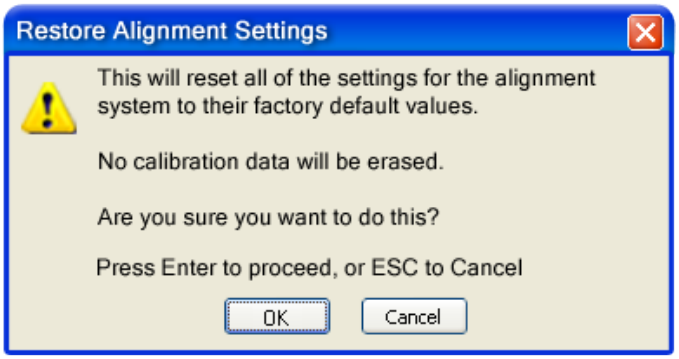
Key Path	System, Restore System Defaults
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

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

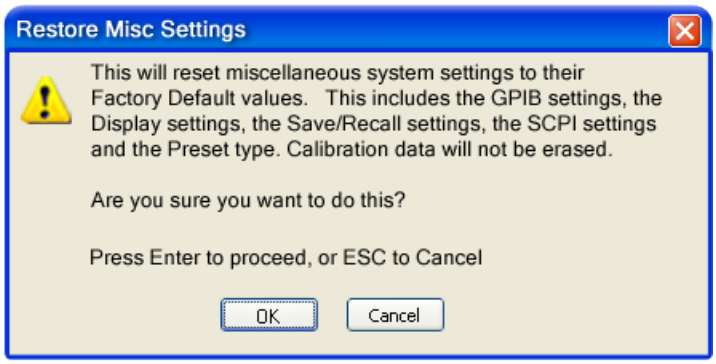
Restore Misc Defaults

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:

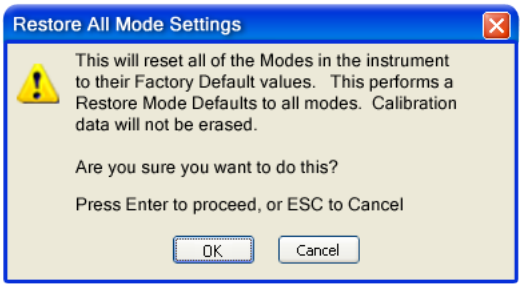


Key Path	System, Restore System Defaults
Example	:SYST:DEF MISC
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	x.14.50

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:

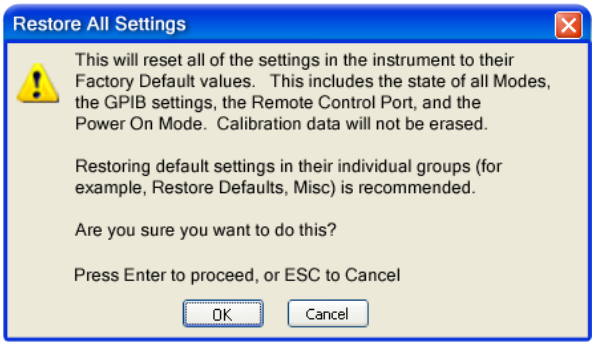


Key Path	System, Restore System Defaults
Example	:SYST:DEF MOD
Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode.. It gets the mode to a consistent state with all of the default 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

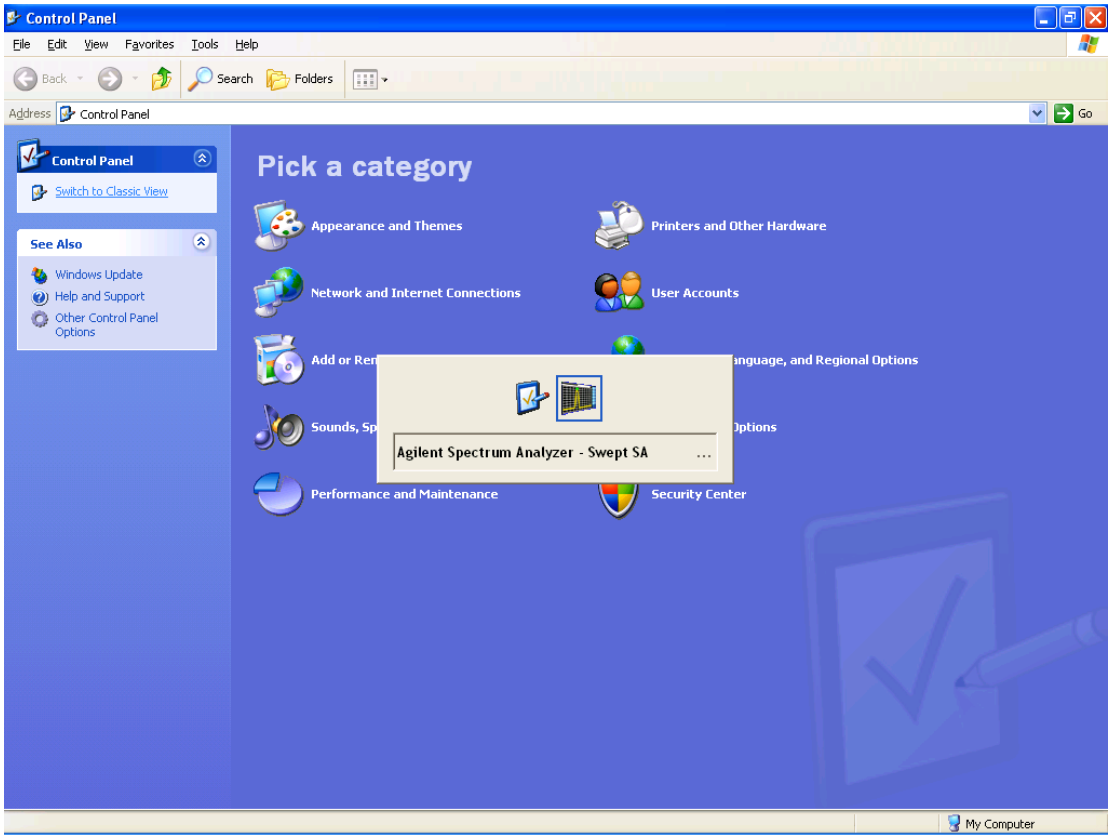
Control Panel...

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:CONFigure: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.

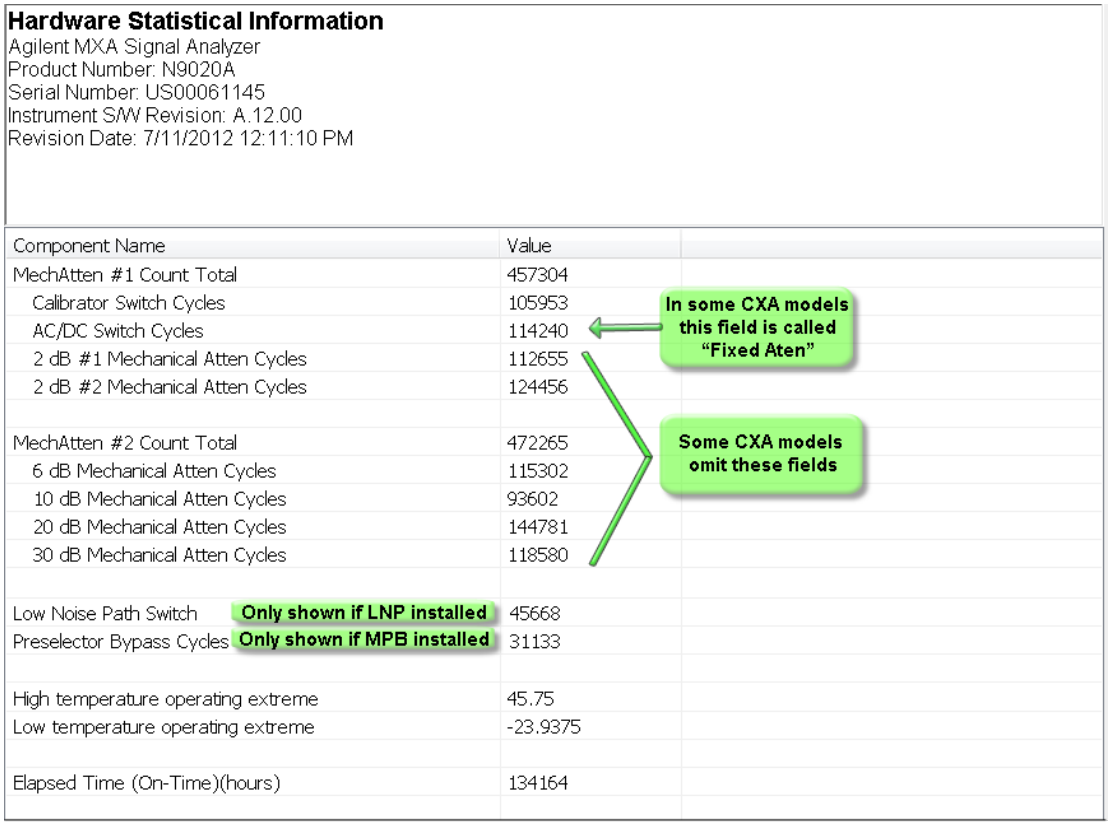
Key Path	System
Initial S/W Revision	Prior to A.02.00

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.



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 queriedvia SCPI.

- Error! Reference source not found.
- Error! Reference source not found.
- Error! Reference source not found.

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:

All other models:

"–330, Self-test failed, see log file E:\Agilent\Instrument\FECTestLog.txt"

M9420A:

"–330, Self-test failed, see Front end self test log file under C:\ProgramData\Keysight\X-Series Instrument"

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 : All other models: MMEM:DATA? "E:\ Agilent\Instrument\FECTestLog.txt" M9420A: MMEM:DATA? " C:\ProgramData\Keysight\X-Series Instrument_FECSelfTestLog_M9420A_<SerialNumber>.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:ADDRess <string> SYSTem:COMMunicate:LAN:ADDRess?	: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

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 291

See "RF Trigger Source" on page 294

See "I/Q Trigger Source" on page 295

See "More Information" on page 296

Key Path	Front-panel key

Remote Command	`:TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1 | EXTernal2 | IMMediate | LINE | FRAMe | RFBurst | VIDeo | IF | ALARm | LAN | IQMag | IDEMod | QDEMod | IINPut | QINPut | AIQMag | TV | INTernal`
	`:TRIGger:<measurement>[:SEQuence]:SOURce?`
	where <measurement> is the measurement for which you wish to set the Source (blank for the Swept SA measurement)

Example	TRIG:ACP:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the selected input TRIG:SOUR VID 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
Notes	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. Not all trigger sources are available for each input. See the "RF Trigger Source" on page 294 and "I/Q Trigger Source" on page 295 commands for detailed information on which trigger sources are available for each input. Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems. *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. Available ranges and presets can vary from mode to mode.
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. INTernal is only available for M9420A.
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, TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T, MSR	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate 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, WIMAXOFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	WIMAXOFDMA: 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,	1xEVDO(BTS): EXTernal1	IQ not supported	

	WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	All others: IMMediate		
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

```
:TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1 | EXTernal2 |
IMMediate | LINE | FRAMe | RFBurst | VIDeo | IF | ALARm | LAN | TV |
INTernal

:TRIGger:<measurement>[:SEQuence]:RF:SOURce?
```

Example	TRIG:ACP:RF:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the RF input TRIG:RF:SOUR VID Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.
Notes	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. Not all trigger sources are available for each input. For the RF Trigger Source, the following trigger sources are available: –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 M9420A: –INTernal - triggers on the internal source signal *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. Available ranges, and presets can vary from mode to mode.
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

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	`:TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTernal1 | EXTernal2 | IMMediate | IQMag | IDEMod | QDEMod | IINPut | QINPut | AIQMag` `:TRIGger:<measurement>[:SEQuence]:IQ:SOURce?`
Example	TRIG:WAVeform:SOUR IQM

	Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input
Notes	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. Not all trigger sources are available for each input. For the I/Q Trigger Source, the following trigger sources are available: –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 *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. Available ranges, and from mode to mode presets can vary
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.

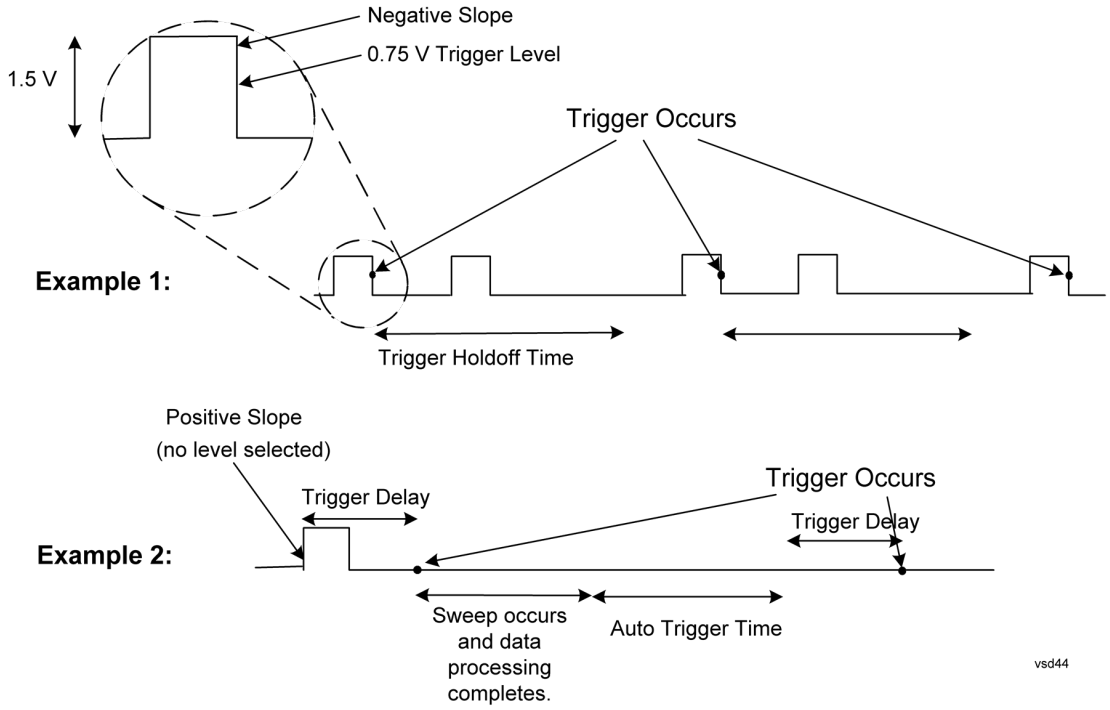
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into 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	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2,

Notes	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 >= 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 >= 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	–3.5V
Max	3.5V
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 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 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	–3.5V
Max	3.5V
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.

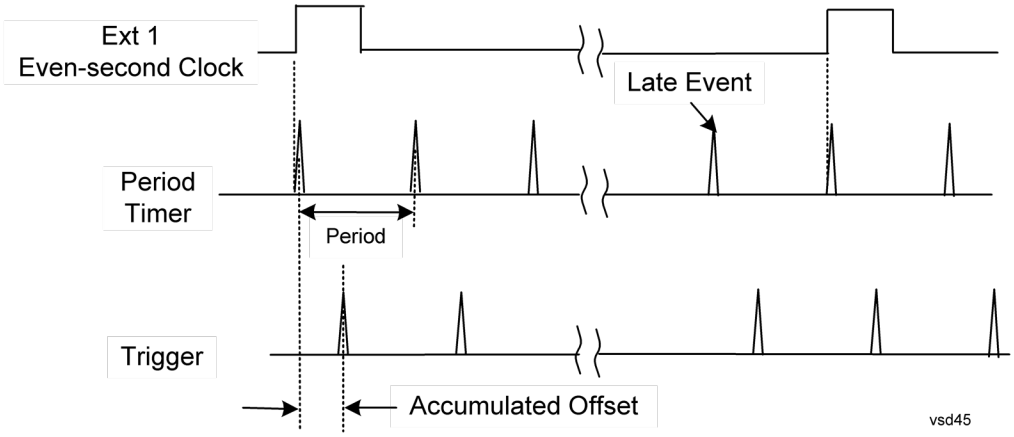
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

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). 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 321. 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

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	–3.5V
Max	3.5V

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	–3.5V
Max	3.5V
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: • 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

Internal

Pressing this key, when it is not selected, selects the signal from internal source module as the trigger. A new sweep/measurement will start when detecting the signal from internal source module.

Prerequisite of internal trigger occurring is there is trigger output from internal source. So user need configure source trigger output before selecting trigger source as internal. To enable source trigger output, output trigger should not be off if internal source works as list sequence mode and Trig 2 Out should not be off if internal source works as MXG mode. Otherwise, no trigger occurs and measurement does not start.

Note: internal trigger type is only available for M9420A.

Key Path	Trigger
Example	TRIG:SOUR INT Swept SA measurement TRIG:<meas>:SOUR INT Measurements other than Swept SA
Notes	See section Error! Reference source not found..
State Saved	Saved in instrument state
Status Bits/OPC dependencies	See section Error! Reference source not found.. 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 M.16.25

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 588.

This topic contains the following sections:

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@29978.

Remote CommandResults for Channel Power Measurement

For WLAN, see Error! Reference source not found.

Command	Return Value
FETCh:CHPower[n]? MEASure:CHPower[n]? READ:CHPower[n]?	Refer to the table below.
FETCh:CHPower:CHPower? MEASure:CHPower:CHPower? READ:CHPower:CHPower?	Returns the Channel Power (dBm) (BW compatibility functionality)
FETCh:CHPower:DENSity? MEASure:CHPower:DENSity? READ:CHPower:DENSity?	Returns the Power Spectral Density (dBm/Hz) (BW compatibility functionality)

n	Results Returned
n=1 (or not specified)	Returns scalar results: 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)	Returns scalar results: When the radio standard is NOT WLAN 802.11ac 80 + 80 MHz: 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. When the radio standard is WLAN 802.11ac 80 + 80 MHz: 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 2is 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 2is 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 valuesand 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	`[: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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined` `[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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. 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]:PDIVision <rel_ampl>` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CHP:VIEW:WIND:TRAC:Y:PDIV 2 DISP:CHP:VIEW:WIND:TRAC:Y:PDIV?
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	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, LTETDD, 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, LTETDD, 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 keyactions 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 334

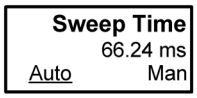
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

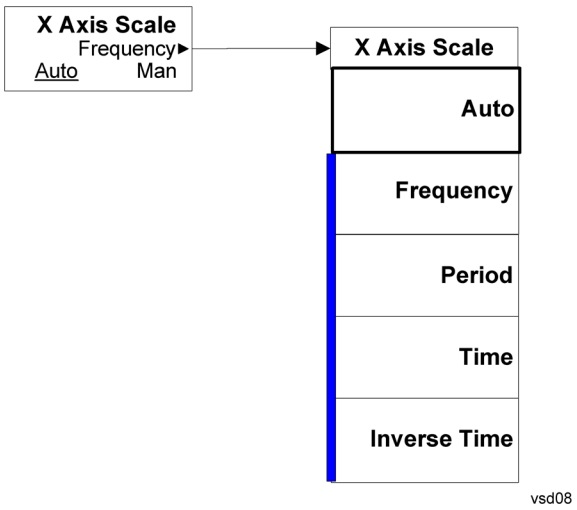
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
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	Sweep time is coupled to the RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. 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). 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.
Preset	SA: Auto WCDMA: 240 kHz C2K: 24 kHz WIMAX OFDMA: 100kHz 1xEVDO: 30kHz DVB-T/H: 3.9kHz DTMB (CTTB): 3.9kHz ISDB-T: 30kHz CMMB: 3.9kHz LTE: Auto LTETDD: Auto Digital Cable TV: 3.9kHz WLAN: 100 kHz MSR: 100kHz LTEAFDD/LTEATDD: Auto WCDMA, C2K, 1xEVDO , WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, Digital Cable TV, WLAN, MSR: OFF SA, LTE, LTETDD, LTEAFDD, LTEATDD: ON
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:BANDwidth:VIDeo <bandwidth>`

	[:SENSe]:CHPower:BANDwidth:VIDeo?
	[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO ON|OFF|1|0
	[:SENSe]:CHPower:BANDwidth:VIDeo:AUTO?
Example	CHP:BAND:VID 2.4 MHz CHP:BAND:VID? CHP:BAND:VID:AUTO OFF CHP:BAND:VID: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.
Dependencies	See Couplings
Couplings	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. 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. 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 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). When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio
Preset	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

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, LTETDD, 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.

File

See "File" on page 224

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 346

See Ext Mix Center Freq

See "I/Q Center Freq" on page 348

See "Center Frequency Presets" on page 344

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 344 and "RF Center Freq" on page 346 and Ext Mix Center Freq and "I/Q Center Freq" on page 348.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 344 and "RF Center Freq" on page 346 and "I/Q Center Freq" on page 348.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 344 and "RF Center Freq" on page 346 and "I/Q Center Freq" on page 348.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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 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

Input/Output

See "Input/Output" on page 176

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, LTETDD, 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, DCATV, 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, DCATV, 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, DCATV, 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, DCATV, 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.**

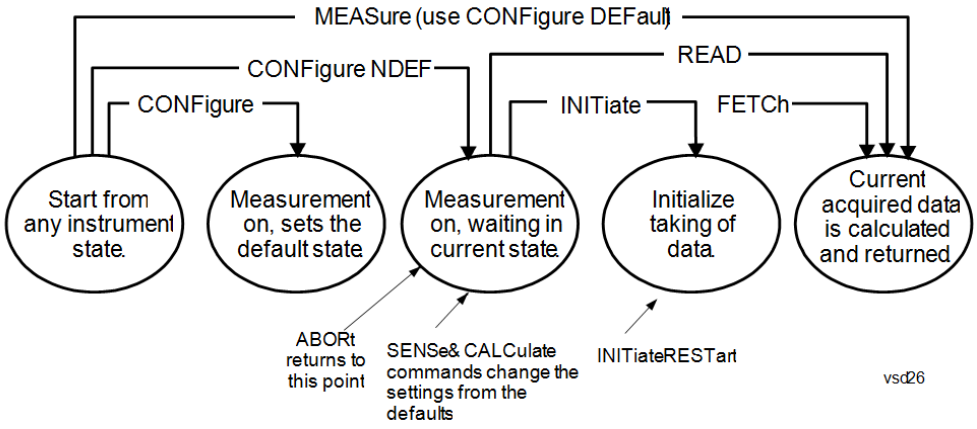
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} \text{Xi}$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} |\text{Xi}|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in region(s)} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi\ Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

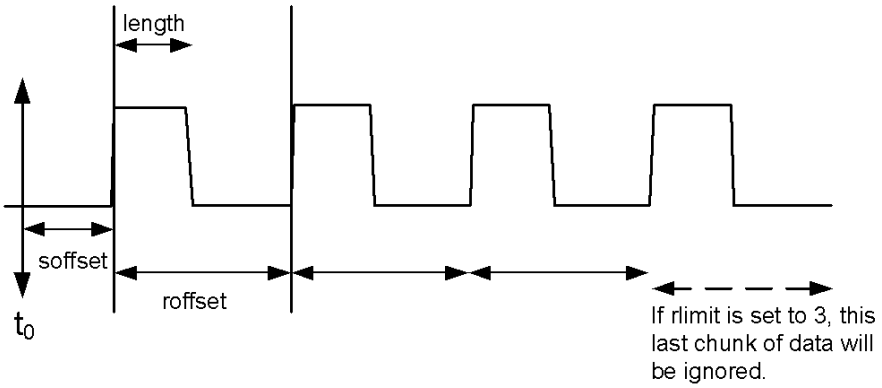
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

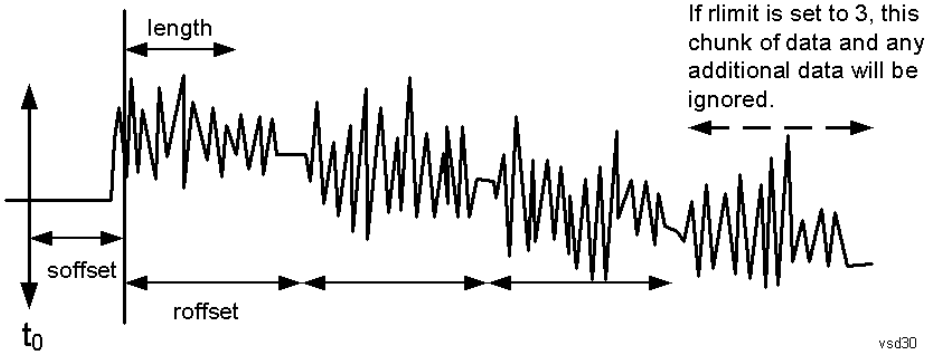
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

Example	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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 compitible 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: 7.61MHz 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
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

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 compitible 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	This command is query only. When Power Limit is off, the returned value is always 0 (pass). When Power Limit is on, the returned value is 0(pass) while power test passes and 1(fail) while power test fails. In MSR, LTE-Advanced FDD/TDD mode, this feature is not supported. In order to keep backwards compitible with the legacy LTE FDD/TDD, the scpi command is supported in LTE & LTE-A converged application.
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	This command is query only. When PSD Limit is off, the returned value is always 0 (pass). When PSD Limit is on, the returned value is 0(pass) while PSD test passes and 1(fail) while PSD test fails.
Initial S/W Revision	A.10.00

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

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

Mode

See "Mode" on page 200

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 395 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 219

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 229

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.

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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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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 404.

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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

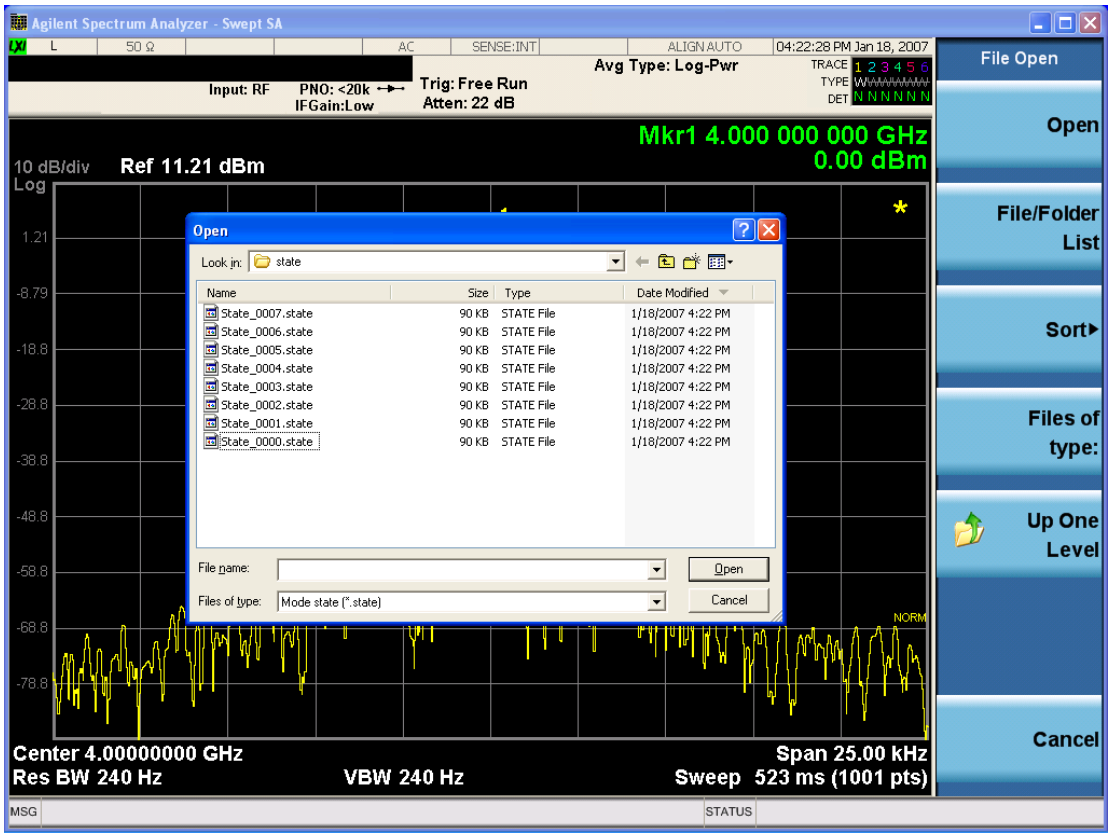
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

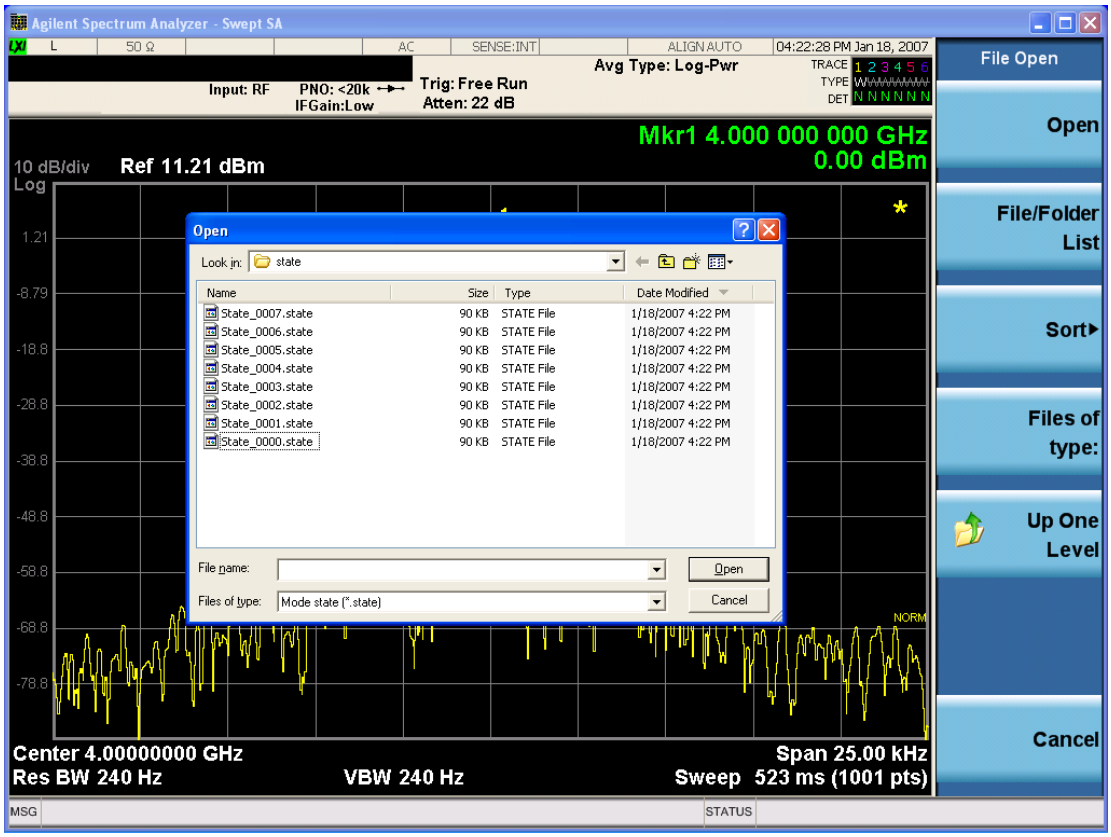
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 415

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

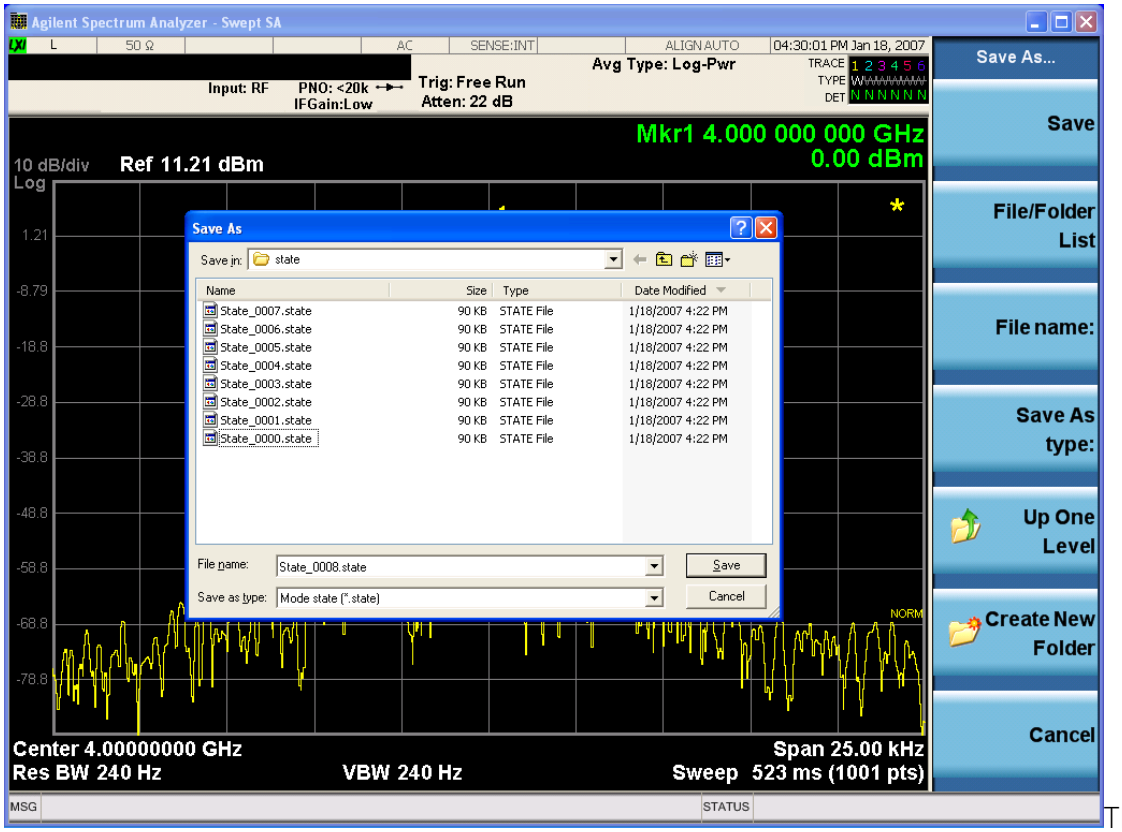
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 420

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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.

NOTE In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

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	The string must be a valid logical path. 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. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
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	The string must be a valid logical path. Copies 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.

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	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. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information which describes the current state of the analyzer. It is detailed in Meas Result File Contents below.

Key Path	Save, Data
Remote Command	`:MMEMory:STORe:RESults <string>`
Example	:MMEM:STOR:RES “MeasR_0000.csv”
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports Channel Power measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\CHP\results.

	Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. The SCPI parameter is a quoted string, which specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Channel Power measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete.
Initial S/W Revision	Prior to A.02.00

Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is “MeasResult”
- Measurement ID following Mode ID, which is “SA:CHP” for example.
- Firmware rev and model number
- Option string
- Auto Sweep Time Rules
- Average Mode
- Average Number
- Average State
- Center Frequency
- Detector
- Electrical Atten
- Electrical Atten State
- IFGain
- IFGainAuto
- Impedance
- Integ BW
- Internal Preamp
- Internal Preamp Band
- Mechanical Atten
- MechanicalAttenStepEnum
- PSD Unit
- Resolution Band Width

- Resolution Bandwidth Shape
- RRC Filter Alpha
- RRC Filter BW
- RRC Filter State
- Span
- Sweep Points
- Sweep Time
- Sweep Time Auto
- TriggerSource
- Video Bandwidth
- Y Axis Unit

The file contains these data followed by MeasResult1 and MeasResult2 that flag the start of the measurement results. Each line of Measurement Results consists of two comma separated values, MeasResult1 value and MeasResult2 value. MeasResult1 contains the same results as MEAS/READ/FETCh:CHPower1; MeasResult2, MEAS/READ/FETCh:CHPower2.

Exported file is .csv file. The Meas Results file, when imported into Excel, will show the following data:

MeasResult	
SA:CHP	
A.10.53	N9030A
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1
Auto Sweep Time Rules	Normal
Average Mode	Exponential
Average Number	10
Average State	TRUE
Center Frequency	13255000000
Detector	Average
IFGain	FALSE
IFGainAuto	FALSE
Impedance	50
Integ BW	2000000
Internal Preamp	FALSE
Internal Preamp Band	Low
PSD Unit	DbmHz

Resolution Band Width	27000
Resolution Bandwidth Shape	Gaussian
RRC Filter Alpha	0.22
RRC Filter BW	3840000
RRC Filter State	FALSE
Span	3000000
Sweep Points	1001
Sweep Time	0.004933333
Sweep Time Auto	TRUE
TriggerSource	Free
Video Bandwidth	270000
Y Axis Unit	DecibelMilliwatt
MeasResult1	MeasResult2
-76.8141133132837	-95.29174
-139.824413269924	-94.99601
	-94.95281
	-95.17146

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

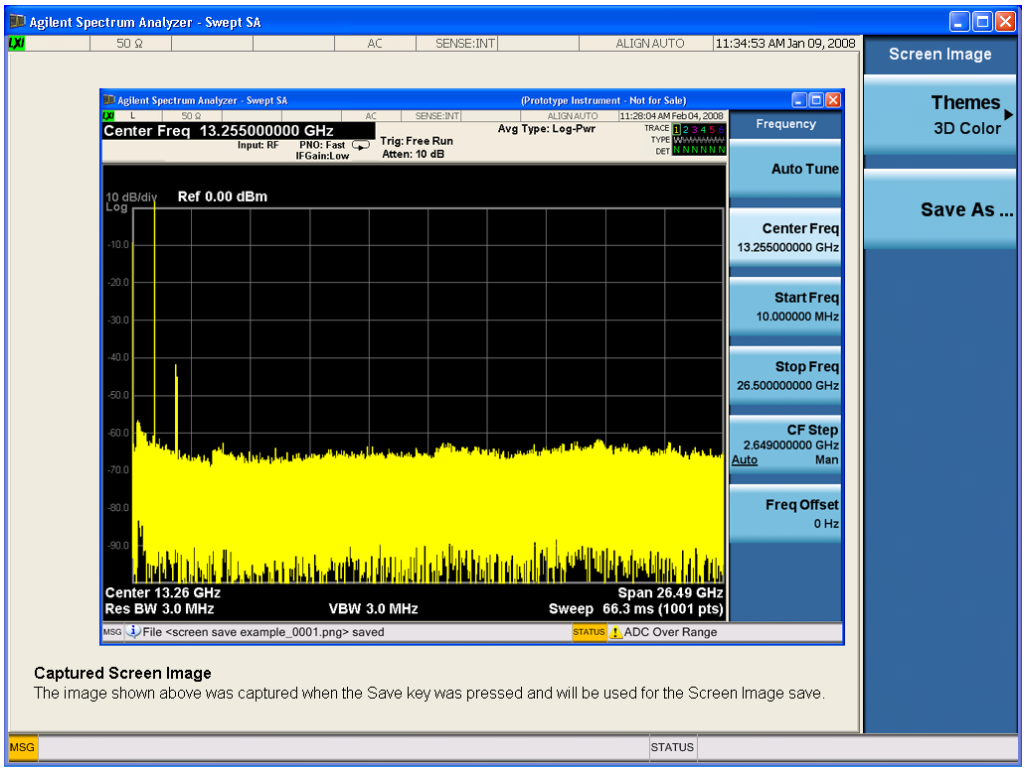
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 436

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 439 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	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. 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. 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. 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.
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 the "RF Power Range " on page 439 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 439 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 443, "W-CDMA Channel Number Ranges" on page 444, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 446, and "LTE FDD Channel Number Ranges" on page 448.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 806.000 0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 851.000 0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link) Uplink (MS, reverse link) Uplink (MS, reverse link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 450.000 0.025×(N–472)+ 410.000 0.025×(N–1536)+ 479.000
	Downlink (BS, forward link) Downlink (BS, forward link) Downlink (BS, forward link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 460.000 0.025×(N–472)+ 420.000 0.025×(N–1536)+ 489.000

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

$Nt = 5*F\ 0.0\ MHz \leq F \leq 3276.6\ MHz$

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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 2010–2025 MHz	9504 to 9596 10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz 1930–1990 MHz	9254 to 9546 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 “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 2009 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source

Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`

Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns :SOUR:RAD:ARB:TRIG:EXT:DEL? :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms OFF
Min	0 s
Max	8.589934588 s (Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (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	`[:SENSe]:CHPower:FREQuency:SPAN <freq>` `[:SENSe]:CHPower:FREQuency:SPAN?`
Example	CHP:FREQ:SPAN 10 MHz CHP:FREQ:SPAN?
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 compitible 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 key is not enabled and its value is coupled with the spacing between the center frequencies of the two carriers. Span = | Center Frequency 1 – Center Frequency 2| + Integ BW + 40 MHz Margin. When the calculated span is over 1 GHz, it's still coupled to its maximum value, which is 1 GHz.
Couplings	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. 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.

Preset	SA: 3 MHz WCDMA: 7.5 MHz C2K: 1.845 MHz WIMAX OFDMA: 20 MHz 1xEVDO: 2.0MHz DVB-T/H: 10MHz DTMB (CTTB): 10MHz ISDB-T: 10MHz CMMB: 10MHz LTE: 7.5 MHz LTETDD: 7.5 MHz Digital Cable TV: 10MHz WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM): 30 MHz if Radio Std is 802.11b: 37.5MHz if Radio Std is 802.11n(20MHz): 30 MHz if Radio Std is 802.11n(40MHz: 60 MHz if Radio Std is 802.11ac (20 MHz): 30 MHz if Radio Std is 802.11ac (40 MHz): 60 MHz if Radio Std is 802.11ac (80 MHz): 120 MHz if Radio Std is 802.11ac (160 MHz): 240 MHz if Radio Std is 802.11ac (80 MHz + 80 MHz): 360 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, A14.50

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 compitible 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, 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
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 sweep timeand source for the current measurement. See Key and Command Descriptions – Sweep/Control for more information.

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

Sweep Time

Selects the length of time that the spectrum analyzer sweeps the displayed frequency span. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the 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	`[:SENSe]:CHPower:SWEep:TIME <time>`
	`[:SENSe]:CHPower:SWEep:TIME?`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO?`

Example	CHP:SWE:TIME 25ms CHP:SWE:TIME? CHP:SWE:TIME:AUTO OFF CHP:SWE:TIME:AUTO?
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.
Min	1 ms
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 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.

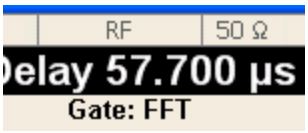
Key Path	Sweep/Control
Scope	Meas Global
Readback	The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT.
Initial S/W Revision	Prior to A.02.00

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: • 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

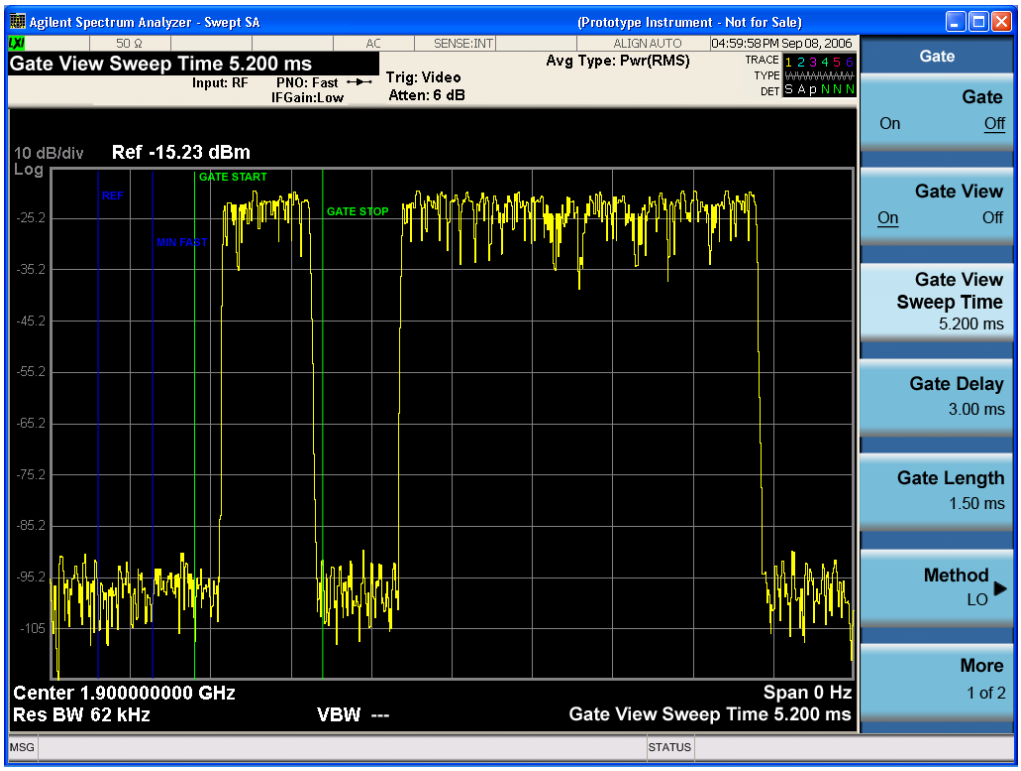
Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

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.

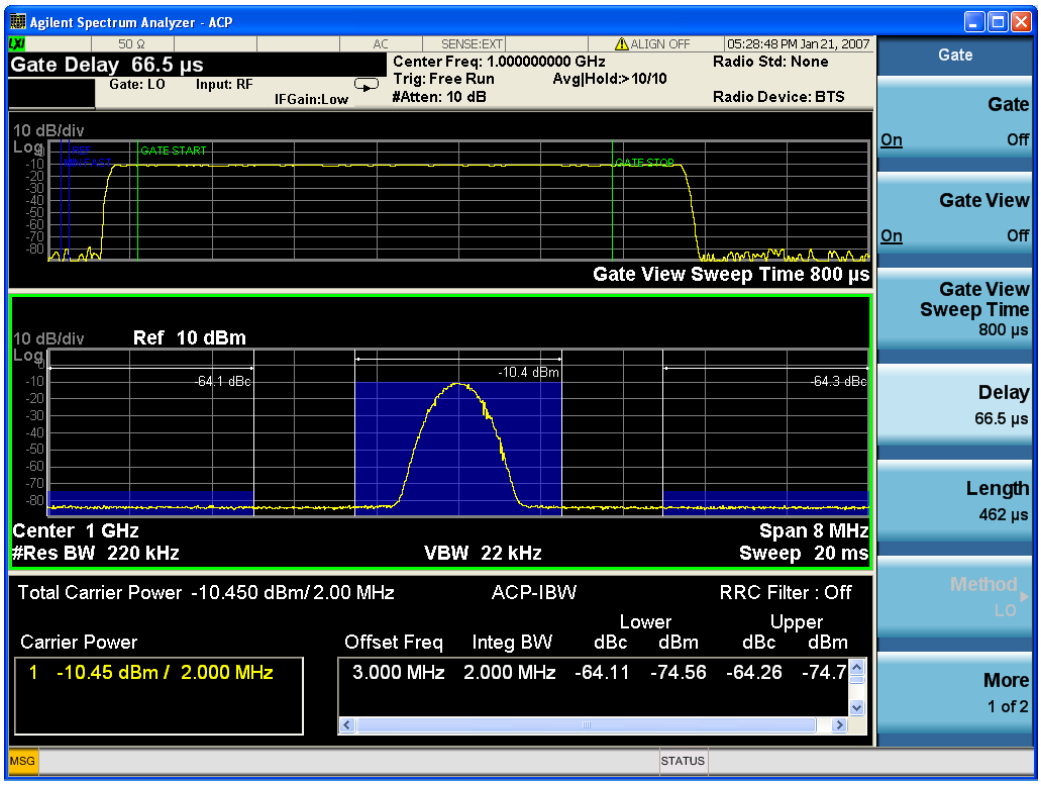
Key Path	Sweep/Control, Gate
Remote Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.

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: • 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 1468 • 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: • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. 1. Compute the location of the "gate stop" line, which you know is at time t = tmin + GateDelay +

	GateLength.
Preset	519.3 µs 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	–3.5V
Max	3.5V
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	–3.5V
Max	3.5V
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.

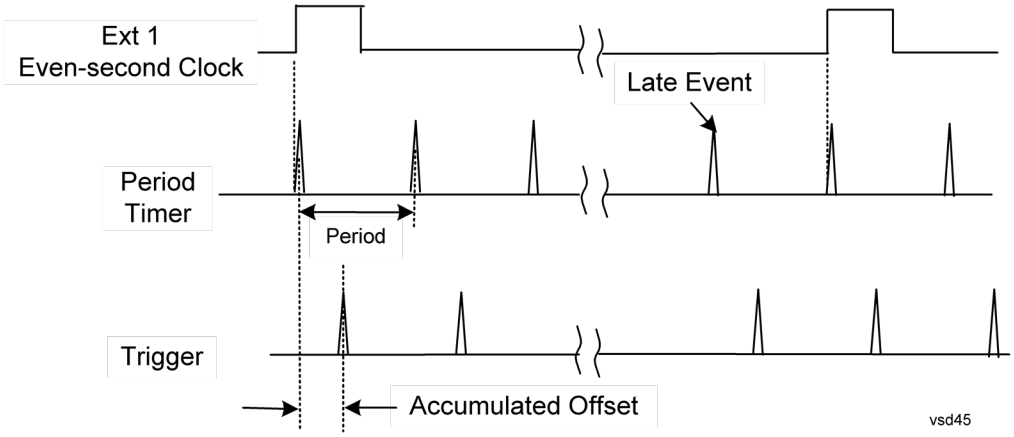
A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source

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	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 321.

	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 321 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	–3.5V
Max	3.5V
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	–3.5V
Max	

	3.5V
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: • 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 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	`[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel <voltage>` `[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel?`
Notes	This command is simply an alias to :TRIGger[:SEQuence]:EXTernal[1]|2:LEVel 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	`[:SENSe]:SWEep:EGATe:POLarity NEGative|POSitive` `[:SENSe]:SWEep:EGATe:POLarity?`
Example	SWE:EGAT:POL NEG SWE:EGAT:POL?
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:POLarity 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 sweep 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 sweep 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	`[:SENSe]:CHPower:SWEep:POINts <integer>` `[:SENSe]:CHPower:SWEep:POINts?`
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) 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 changes, the sweep 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 230

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	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. 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. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Negative Peak detector determines the minimum of the signal within the sweep points.
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 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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.

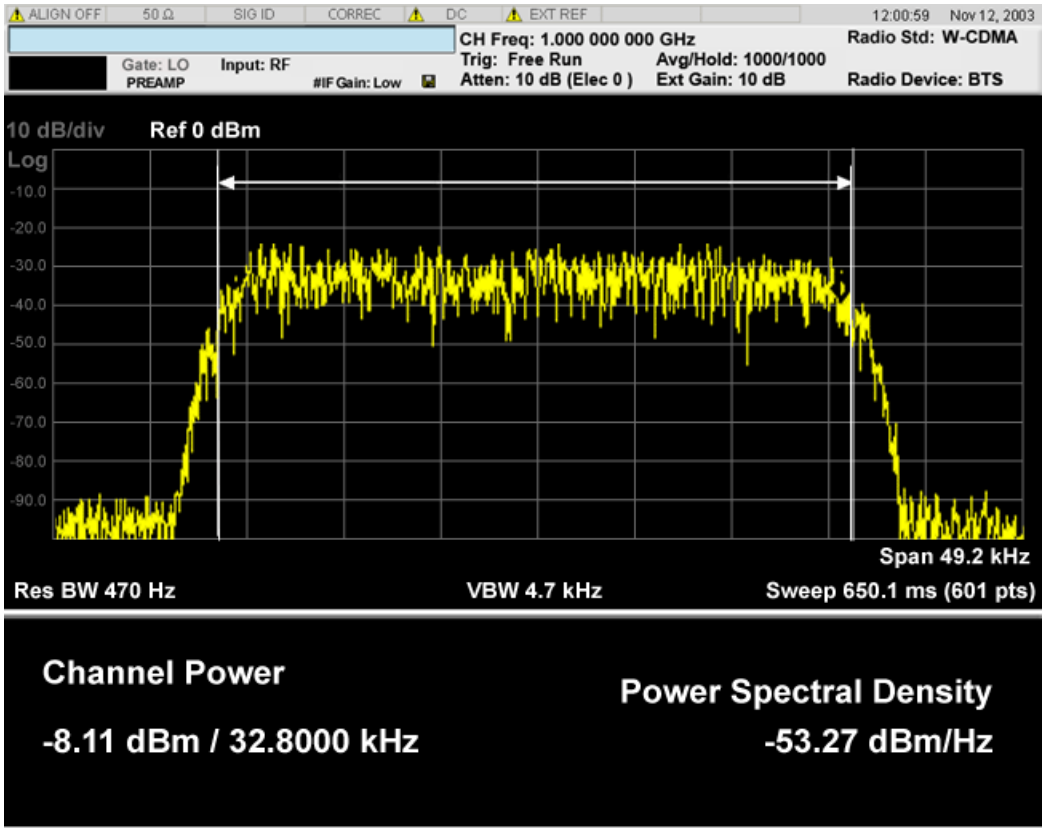
Key Path	User Preset
Remote Command	`:SYSTem:PRESet:USER:SAVE`
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W 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.

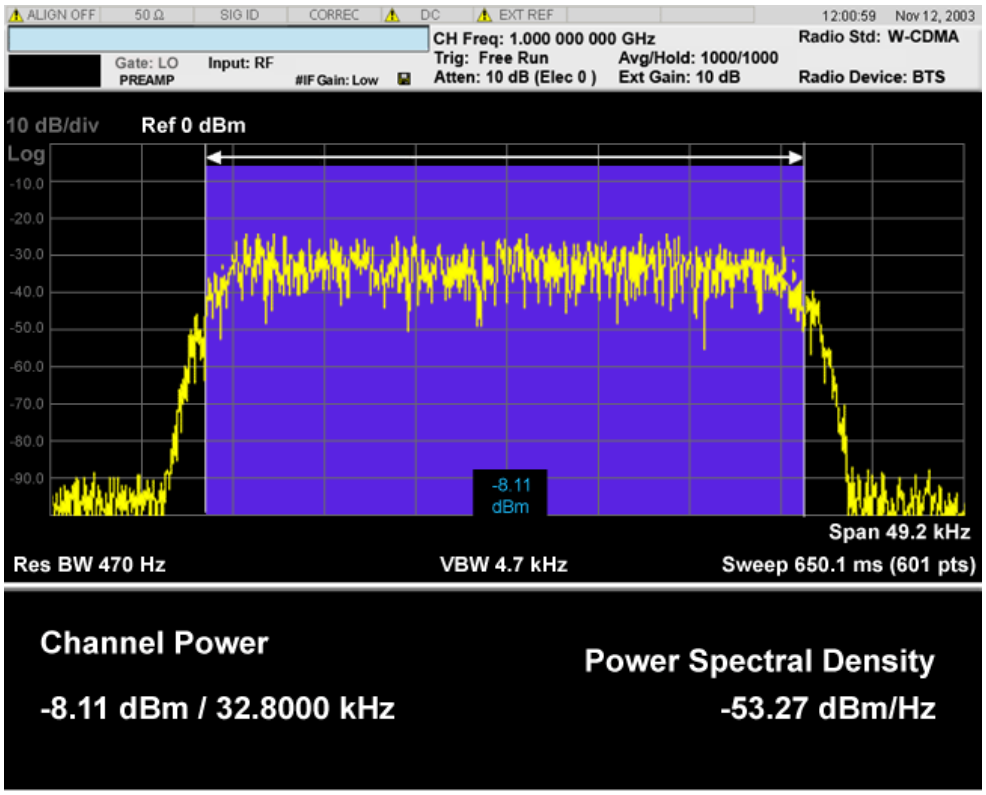
The results of the measurement can be displayed as a single spectrum trace view or displayed with a Bar Graph trace on the spectrum trace.

Spectrum View with Bar Graph off



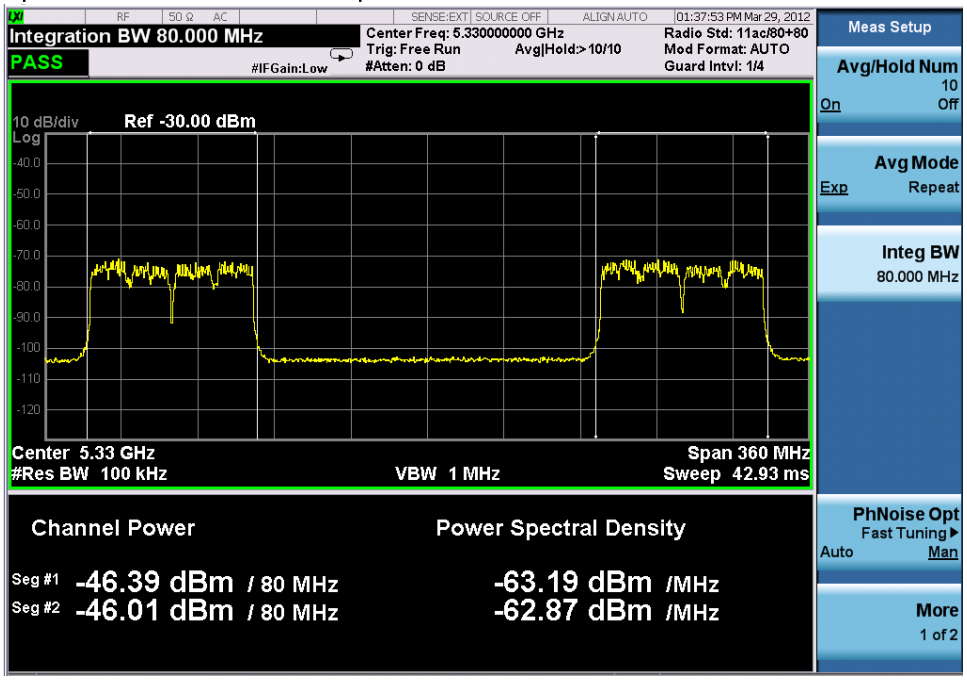
Spectrum View with Bar Graph on

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.

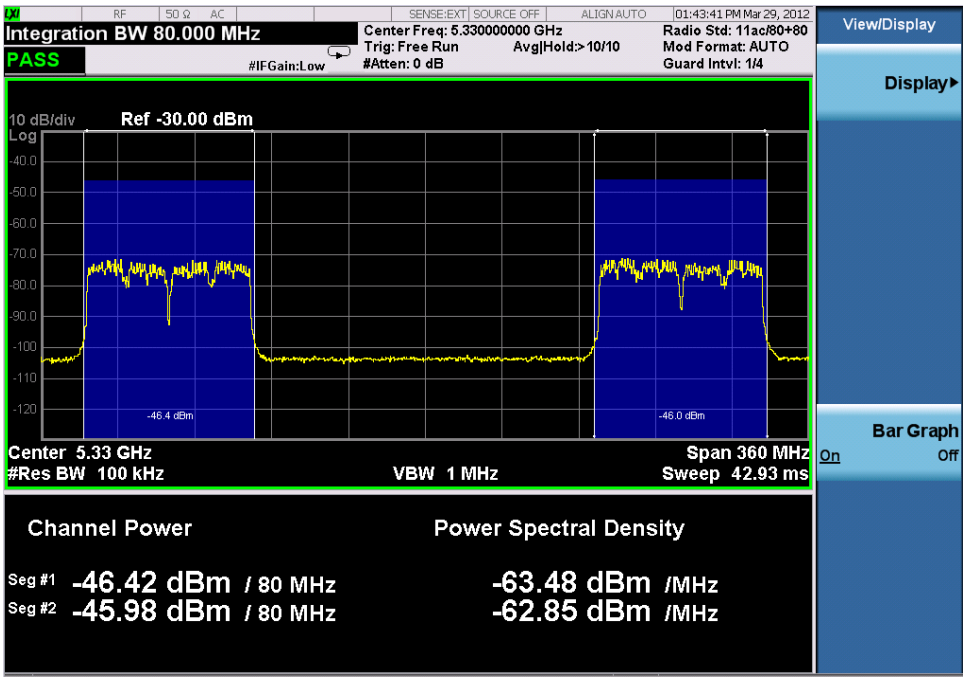


If the current mode is WLAN and the format is WLAN 802.11ac 80+80 MHz, the spectrum view is changed a little so that the results of both carrier segments can be displayed.

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):



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.

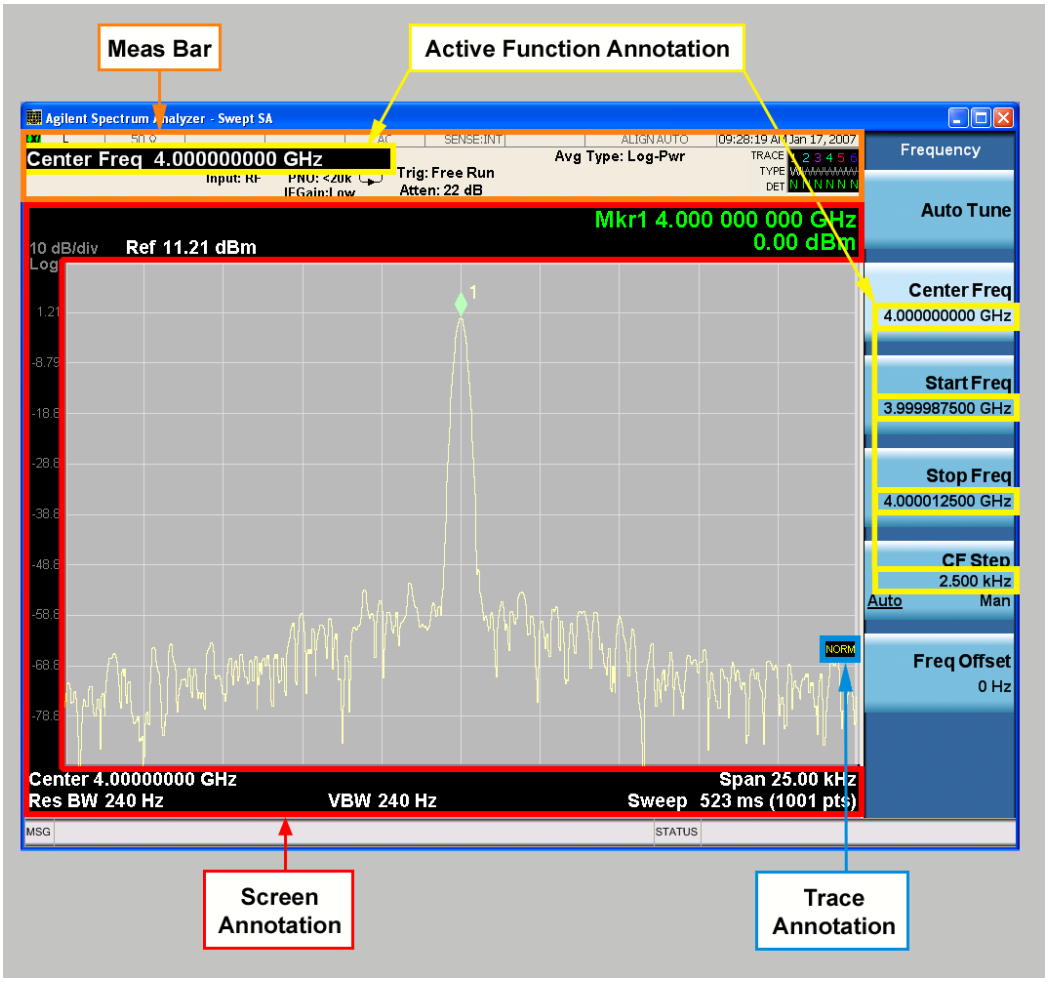
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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

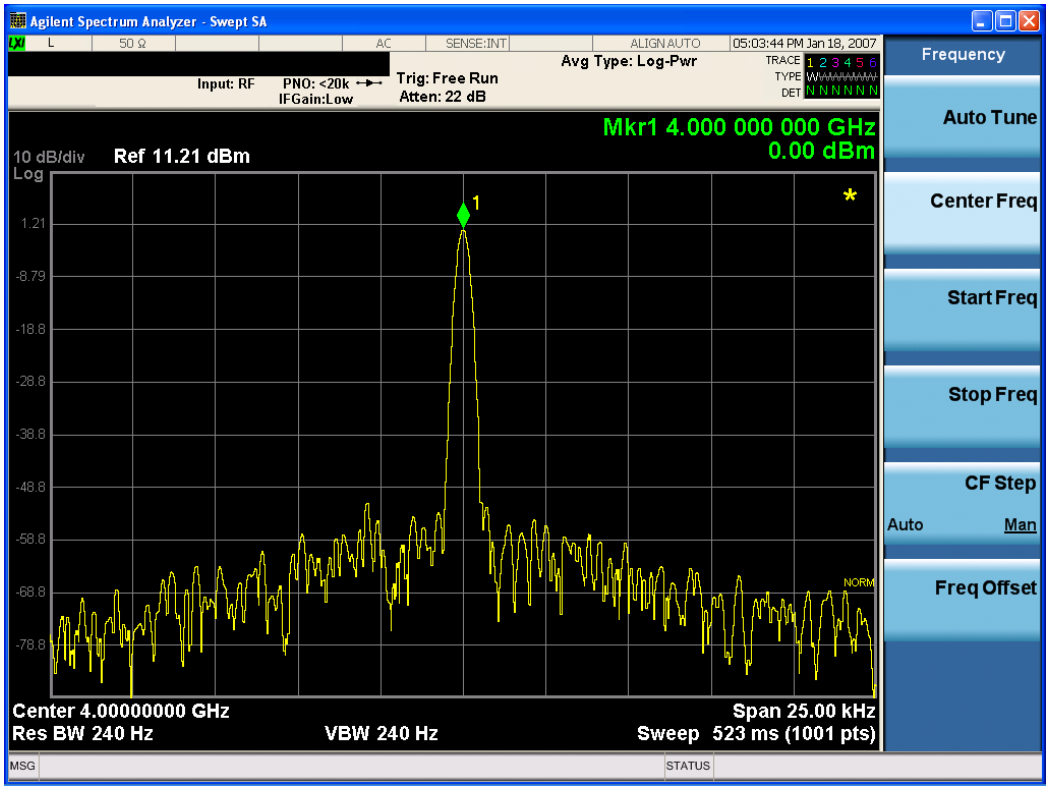
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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

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, LTETDD, 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.

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

9 ACP Measurement

ACP is a measurement of the amount of interference, or power, in an adjacent frequency channel. The results are displayed as a bar graph or as spectrum data, with measurement data at specified offsets. For measurement results and views, see "View/Display" on page 909.

This topic contains the following sections:

Measurement Commands for ACP

The following commands are used to retrieve the measurement results:

```
:CONFigure:ACP
:CONFigure:ACP:NDEFault
:INITiate:ACP
:FETCh:ACP[n]?
:READ:ACP[n]?
:MEASure:ACP[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section Remote Measurement Functions@29978.

Remote Command Results for ACP Measurement

Condition	N	Results Returned
Mode = SA mode, Radio Std = None, Number of carriers = 1 and only offset A is on	Not specified or n = 1	Returns 3 comma-separated values that correspond to: Reference carrier power, lower-adjacent channel power (dBc), and upper-adjacent channel power (dBc).
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz, Number of carriers = 1 and Meas Type = Power spectral density reference	not specified or n = 1	Returns 32 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz or dBm/MHz) 3. 0.0 4. Reference carrier power (dBm/Hz or dBm/MHz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz or dBm/MHz) 29. –999.0 30. –999.0 31. –999.0 32. –999.0 The last four (29, 30, 31 and 32) results always returned –999.0. If the results are not available, –999.0 is returned.
Meas Type = Total power reference	Not specified or n = 1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm) 3. 0.0 4. Reference carrier power (dBm) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm)

Condition	N	Results Returned
		9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm) If the results are not available, –999.0 is returned. When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results and their reference value(s).
Meas Type = Power spectral density reference	not specified or n = 1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz or dBm/MHz) 3. 0.0 4. Reference carrier power (dBm/Hz or dBm/MHz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz or dBm/MHz) If the results are not available, –999.0 is returned. When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results and their reference value(s).
Meas Method = FAST	not specified or n = 1	Returns 5 comma-separated results, in the following order: 1. Reference carrier - absolute power (dBm) 2. Lower offset A - absolute power (dBm) 3. Upper offset A - absolute power (dBm) 4. Lower offset B - absolute power (dBm) 5. Upper offset B - absolute power (dBm)
Mode = MSR , LTEAFDD,	Not specified	Returns 28 comma-separated scalar results, in the following order.

Condition	N	Results Returned
LTEATDD, Meas Type = Total power reference and Power Ref = Left & Right Carriers	or n = 1	1. 0.0 2. Total carrier power (dBm) 3. Left Reference carrier power (dBm) 4. Right Reference carrier power (dBm) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm) If the results are not available, –999.0 is returned.
Mode = MSR , LTEAFDD, LTEATDD, Meas Type = Power spectral density reference and Power Ref = Left & Right Carriers	not specified or n = 1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz or dBm/MHz) 3. Left reference carrier power (dBm/Hz or dBm/MHz) 4. Right reference carrier power (dBm/Hz or dBm/MHz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz or dBm/MHz) ... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz or dBm/MHz) If the results are not available, –999.0 is returned. When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results and their reference value(s).
Meas Type = Total	n = 2	Returns 48 scalar results, in the following order:

Condition	N	Results Returned
power reference		1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm) ... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm) ... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm) If the results are not available, –999.0 is returned. When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results and their reference value(s).
Meas Type = Power spectral density reference	n = 2	Returns 48 scalar results, in the following order: 1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm/Hz or dBm/MHz) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm/Hz or dBm/MHz) ... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm/Hz or dBm/MHz) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm/Hz or dBm/MHz) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm/Hz or dBm/MHz) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm/Hz or dBm/MHz) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm/Hz or dBm/MHz)

Condition	N	Results Returned
		... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm/Hz or dBm/MHz) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm/Hz or dBm/MHz) If the results are not available, –999.0 is returned. When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results.
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz and Meas Type = Total power reference	n = 3	Returns 28 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as total power in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21. Lower offset F - relative limit result 22. Lower offset F - absolute limit result 23. Upper offset F - relative limit result 24. Upper offset F - absolute limit result 25. Inside Adjacent Channel - relative limit result 26. Inside Adjacent Channel - absolute limit result 27. Outside Adjacent Channel - relative limit result 28. Outside Adjacent Channel - absolute limit result If Radio Device = Exciter, the last four (25, 26, 27 and 28) results returned –999.0.
Mode = DTMB (CTTB) or CMMB, Radio BW = 8 MHz and Meas Type = Power spectral density reference	n = 3	Returns 28 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as power spectral density in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result

Condition	N	Results Returned
		8. Upper offset B - absolute limit result ... 21. Lower offset F - relative limit result 22. Lower offset F - absolute limit result 23. Upper offset F - relative limit result 24. Upper offset F - absolute limit result 25. –999.0 26. –999.0 27. –999.0 28. –999.0 The last four results always returned –999.0.
Meas Type = Total power reference	n = 3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as total power in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ... 21 Lower offset F - relative limit result 22 Lower offset F - absolute limit result 23 Upper offset F - relative limit result 24 Upper offset F - absolute limit result When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results.
Meas Type = Power spectral density reference	n = 3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as power spectral density in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result

Condition	N	Results Returned
		...
		21 Lower offset F - relative limit result
		22 Lower offset F - absolute limit result
		23 Upper offset F - relative limit result
		24 Upper offset F - absolute limit result
		When in MSR and LTE-Advanced FDD/TDD, this trace includes only outer offset results.
	n = 4	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 1
	n = 5	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 2
	n = 6	Returns <Num Pts> comma-separated scalar values representing the Y values in Trace 3
Meas Type = Total power reference	n = 7	Returns (2 * Number of Carriers) scalar results, in the following order:
		The Number of Carriers is the value filled in Carriers under Carrier Setup menu. If license N9060A–5FP is enabled, max value of Number of Carriers is 18, otherwise, max value of Number of Carriers is 12. In MSR mode, max value of Number of Carriers is 100. In LTE-Advanced FDD/TDD mode, max value of number of carriers is 5.
		1. Channel (1) - relative power (dB)
		2. Channel (1) - absolute power (dBm)
		3. Channel (2) - relative power (dB)
		4. Channel (2) - absolute power (dBm)
		...
		2 * Number of Carriers –1. Channel (Number of Carriers) - relative power (dB)
		2 * Number of Carriers. Channel (Number of Carriers) - absolute power (dBm)
		If the results are not available, 9.91E+37 is returned.
Meas Type = Power spectral density reference	n = 7	Returns (2 * Number of Carriers) scalar results, in the following order: The Number of Carriers is the value filled in Carriers under Carrier Setup menu.
		If license N9060A–5FP is enabled, max value of Number of Carriers is 18, otherwise, max value of Number of Carriers is 12. In MSR mode, max value of Number of Carriers is 100. In LTE-Advanced FDD/TDD mode, max value of number of carriers is 5.
		1. Channel (1) - relative power (dB)
		2. Channel (1) - absolute power (dBm/Hz or dBm/MHz)
		3. Channel (2) - relative power (dB)
		4. Channel (2) - absolute power (dBm/Hz or dBm/MHz)
		...
		2 * Number of Carriers –1. Channel (Number of Carriers) - relative power (dB)
		2 * Number of Carriers. Channel (Number of Carriers) - absolute power (dBm/Hz or dBm/MHz)

Condition	N	Results Returned
		If the results are not available, 9.91E+37 is returned
Mode = MSR,LTEAFDD,LTEATDD	n = 8	Returns scalar results, in the following order: 1. 0.0 2. Total carrier power (dBm) 3. 0.0 4. Reference carrier power (dBm, dBm/Hz or dBm/MHz) 5. Inner Lower offset A - relative power (dB) 6. Inner Lower offset A - absolute power (dBm, dBm/Hz or dBm/MHz) 7. Inner Upper offset A - relative power (dB) 8. Inner Upper offset A - absolute power (dBm, dBm/Hz or dBm/MHz) 9. Inner Lower offset B - relative power (dB) 10. Inner Lower offset B - absolute power (dBm, dBm/Hz or dBm/MHz) 11. Inner Upper offset B - relative power (dB) 12. Inner Upper offset B - absolute power (dBm, dBm/Hz or dBm/MHz) ... 25. Inner Lower offset F - relative power (dB) 26. Inner Lower offset F - absolute power (dBm, dBm/Hz or dBm/MHz) 27. Inner Upper offset F - relative power (dB) 28. Inner Upper offset F - absolute power (dBm, dBm/Hz or dBm/MHz) When Power Ref is either Left & Right Carriers or Max Power Carrier in Sub-block, the first four values are 1. 0.0 2. Total carrier power (dBm) 3. Reference carrier in the lower sub-block (dBm, dBm/Hz or dBm/MHz) 4. Reference carrier in the upper sub-block (dBm, dBm/Hz or dBm/MHz) Unit of absolute power results. dBm: Meas Type = Total Pwr Ref dBm/Hz: Meas Type = PSD Ref, PSD Unit = dBm/Hz dBm/MHz: Meas Type = PSD Ref, PSD Unit = dBm/MHz If the results are not available, 9.91E+37 is returned.
Mode = MSR, LTEAFDD,LTEATDD	n = 9	Returns scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies. 1. Inner Lower offset A - relative limit result 2. Inner Lower offset A - absolute limit result 3. Inner Upper offset A - relative limit result 4. Inner Upper offset A - absolute limit result 5. Inner Lower offset B - relative limit result 6. Inner Lower offset B - absolute limit result

Condition	N	Results Returned
		7. Inner Upper offset B - relative limit result 8. Inner Upper offset B - absolute limit result ... 21. Inner Lower offset F - relative limit result 22. Inner Lower offset F - absolute limit result 23. Inner Upper offset F - relative limit result 24. Inner Upper offset F - absolute limit result
Mode = MSR, LTEAFDD,LTEATDD	n = 10	Returns scalar values of offset results. Numbers returned in this trace is 10 x actually measured offsets. Note that upper and lower sides of an offset are returned separately. For example, when only outer offset A is measured with offset side both, 10 x 2 = 20 values are returned. 1. Inner = 1 or Outer = 2. 2. Offset A~F. (A=1, B=2, ... F=6) 3. Offset Side. Lower=1 or Upper=2 4. Relative power or relative PSD (dBc or dB) 5. Absolute power (dBm) or absolute PSD (dBm/Hz or dBm/MHz) 6. Reference power (dBm) or reference PSD (dBm/Hz or dBm/MHz) 7. Reference Index 1 8. Reference Index 2 9. 0 (Reserved) 10. 0 (Reserved) ... 10(n–1)+1. Inner = 1 or Outer = 2. 10(n–1)+2. Offset A~F. (A=1, B=2, ... F=6) 10(n–1)+3. Offset Side. Lower=1 or Upper=2 10(n–1)+4. Relative power or relative PSD (dBc or dB) 10(n–1)+5. Absolute power (dBm) or absolute PSD (dBm/Hz or dBm/MHz) 10(n–1)+6. Reference power (dBm) or reference PSD (dBm/Hz or dBm/MHz) 10(n–1)+7. Reference Index 1 10(n–1)+8. Reference Index 2 10(n–1)+9. 0 (Reserved) 10(n–1)+10. 0 (Reserved) Where n is number of offsets. Meas Type determines which type of power result is returned, i.e. power or PSD. Unit for PSD results is determined by PSD Unit. If result is not available, 9.91E+37 is returned.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.13.00

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 selections, 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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RLEV 100 DISP:ACP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the mode that includes ACP measurements 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	10dBm
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	`[: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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined`

	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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. 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, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:PDIV 5 DISP:ACP:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the mode that includes ACP measurements 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.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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTer | BOTTom` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:ACP:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the mode that includes ACP measurements 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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF | ON` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:COUP ON DISP:ACP:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the mode that includes ACP measurements 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	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

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 keyactions 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 616

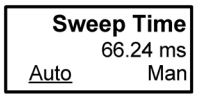
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

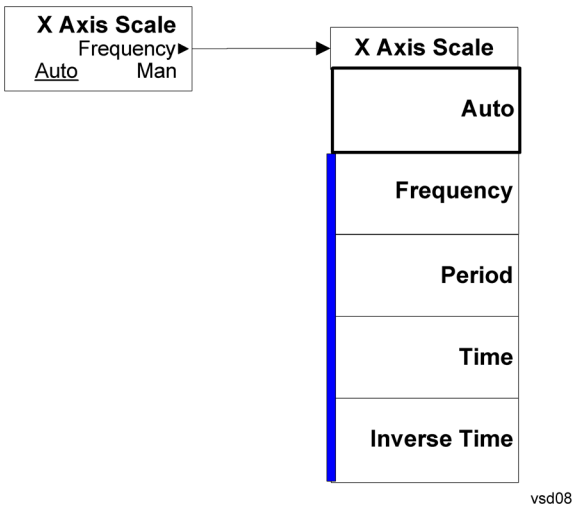
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
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. 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	51KHz
3MHz	
5MHz	100 KHz
10MHz	
15MHz	
20MHz	

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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:BANDwidth[:RESolution] <freq>`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]?`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO ON|OFF|1|0`
	`[:SENSe]:ACPower:BANDwidth[:RESolution]:AUTO?`

Example	ACP:BAND 25kHz ACP:BAND? ACP:BAND:AUTO ON ACP:BAND:AUTO?
Notes	This key is available only in IBW mode. This parameter is preset by the Meas Method selection. Preset values are as follows: IBW: 100 kHz

	IBWR: 27 kHz FAST (WCDMA): 390 kHz You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	The resolution bandwidth is coupled to the video bandwidth based on the video to resolution bandwidth ratio setting if AUTO is selected.
Preset	SA: 220 kHz WCDMA: 100 kHz WIMAX OFDMA: 100 kHz C2K: 15 kHz TD-SCDMA: 30 kHz 1xEVDO: 30 kHz DVB-T/H: 39 kHz DTMB (CTTB): 39 kHz ISDB-T: 39 kHz CMMB: 39 kHz LTE: 100 kHz LTETDD: 100 kHz Digital Cable TV: 39 kHz MSR: 100 kHz LTEAFDD, LTEATDD: 100kHz LTE, LTETDD, LTEAFDD, LTEATDD: 1 Others:0
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	`[:SENSe]:ACPower:BWIDth[:RESolution]` `[:SENSe]:ACP:SWEep:BANDwidth|BWIDth[:RESolution] (PSA W-CDMA, PSA cdma2000 )`
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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB,

	LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:BANDwidth:VIDeo <freq>`
	`[:SENSe]:ACPower:BANDwidth:VIDeo?`
	`[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:BANDwidth:VIDeo:AUTO?`

Example	ACP:BAND:VID 1kHz ACP:BAND:VID? ACP:BWID:VID:AUTO ON ACP:BWID:VID:AUTO?
Notes	The values shown in this table reflect the conditions after a Mode Preset.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	SA: 22 kHz WCDMA, WIMAX OFDMA: 1 MHz C2K: Method RBW: grayed out (1.2 MHz) Method IBW: 150 kHz TD-SCDMA: 300 kHz 1xEVDO: 300 kHz DVB-T/H: 390 kHz DTMB (CTTB): 390 kHz ISDB-T: 390 kHz CMMB: 390 kHz LTE, LTETDD, MSR: Auto LTETDD: 1 MHz Digital Cable TV: 390 kHz LTEAFDD,LTEATDD: Auto SA: ON WCDMA: OFF WIMAX OFDMA: OFF TD-SCDMA: OFF DVB-T/H: OFF DTMB (CTTB): OFF CDMA1xEVDO: OFF ISDB-T: OFF CMMB: OFF LTE, MSR: ON LTETDD: ON Digital Cable TV: OFF

	LTEAFDD, LTEATDD: ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	`[:SENSe]:ACPower:BWIDth:VIDeo`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

RBW Control

Accesses a menu that enables you to select the filter bandwidth and type.

Key Path	BW
Initial S/W Revision	Prior to A.02.00

Filter Type

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

Key Path	BW, RBW Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:ACPower:BANDwidth:SHAPe?`
Example	ACP:BAND:SHAP GAUS ACP:BAND:SHAP?
Dependencies	When Meas Method is FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	GAUSsian C2K: FLATtop
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Backwards Compatibility SCPI	`[:SENSe]:ACPower:BWIDth:SHAPe`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Filter BW

Selects a Gaussian filter based on its –3 dB (Normal) bandwidth or its –6 dB bandwidth.

Key Path	BW, RBW Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:BANDwidth:TYPE DB3|DB6` `[:SENSe]:ACPower:BANDwidth:TYPE?`
Example	ACP:BAND:TYPE DB3 ACP:BAND:TYPE?
Dependencies	When Filter Type is Flattop or Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)|–6 dB
Backwards Compatibility SCPI	`[:SENSe]:ACPower:BWIDth:TYPE`
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.

File

See "File" on page 224

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 629

See Ext Mix Center Freq

See "I/Q Center Freq" on page 631

See "Center Frequency Presets" on page 627

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 627 and "RF Center Freq" on page 629 and Ext Mix Center Freq and "I/Q Center Freq" on page 631.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 627 and "RF Center Freq" on page 629 and "I/Q Center Freq" on page 631.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 627 and "RF Center Freq" on page 629 and "I/Q Center Freq" on page 631.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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 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

Input/Output

See "Input/Output" on page 176

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement. Note that this hard key and all sub keys are unavailable when "Meas Method" on page 698 is set to RBW.

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

Select Marker

Displays 12 markers available for selection. Note that this key is unavailable when "Meas Method" on page 698 is set to RBW.

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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF` `:CALCulate:ACPower:MARKer[1]|2|...|12:MODE?`
Example	CALC:ACP:MARK2:MODE DELT CALC:ACP:MARK2: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 will display the marker value to its full entered precision. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is unavailable when "Meas Method" on page 698 is set to RBW.

Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|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. Note that this key is unavailable when "Meas Method" on page 698 is set to RBW.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection. Note that this key is unavailable when "Meas Method" on page 698 is set to RBW.

Key Path	Marker
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, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:REFerence <integer>` `:CALCulate:ACPower:MARKer[1]|2|...|12:REFerence?`
Example	CALC:ACP:MARK2:REF 6 CALC:ACP:MARK2:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from a remote command, generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value will be returned (the specified marker numbers relative marker). You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is unavailable when "Meas Method" on page 698 is set to RBW.

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

Selects the trace that you want your marker to be placed on. A marker is associated with one and only one trace. This trace is used to determine the placement, result, and X Axis Scale of the marker. All markers have an associated trace, even Fixed markers; it is from that trace that they determine their attributes and behaviors, and it is to that trace that they go when they become Normal or Delta markers.

Key Path	Marker, Properties
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:TRACe 1|2|3` `:CALCulate:ACPower:MARKer[1]|2|...|12:TRACe?`
Example	CALC:ACP:MARK2:TRAC 2 CALC:ACP:MARK2:TRAC?
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 will display the marker value to its full entered precision.
Dependencies	This key is unavailable when "Meas Method" on page 698 is set to RBW.
Couplings	This is not affected by Auto Coupling. Sending the remote command causes the addressed marker to become selected.
Preset	All Markers Off
State Saved	Saved in instrument state.
Range	1|2|3
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Couple Markers

When this function is On, moving any marker causes an equal X axis movement of every other marker which 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).

Key Path	Marker
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ACPower:MARKer:COUPle[:STATe]?`
Example	CALC:ACP:MARK:COUP ON
Dependencies	This key is unavailable when "Meas Method" on page 698 is set to RBW.
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 All Off

Turns all active markers off.

Key Path	Marker
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer:AOFF`
Example	CALC:ACP:MARK:AOFF
Dependencies	This key is unavailable when "Meas Method" on page 698 is set to RBW.
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. This value 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, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:X <freq>` `:CALCulate:ACPower:MARKer[1]|2|...|12:X?`

Example	CALC:ACP:MARK3:X 0 CALC:ACP: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. If the marker is Off the response is not a number.
Dependencies	Unavailable when "Meas Method" on page 698 is set to RBW.
Preset	After a preset, all Markers are turned OFF, so 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

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,Delta or Fixed. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:X:POSition <real>` `:CALCulate:ACPower:MARKer[1]|2|...|12:X:POSition?`
Example	CALC:ACP:MARK10:X:POS 0 CALC:ACP: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 (see "Fractional 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. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 500 (this value might be expected value when all offset is on).
Dependencies	Unavailable when "Meas Method" on page 698 is set to RBW.
Preset	After a preset, all Markers are turned OFF, so 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

Marker Y Axis Value (Remote Command only)

Returns the marker Y axis value in the current marker Y axis unit.

Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:Y?`
Example	CALC:ACP:MARK11:Y?
Notes	Since the result value is always calculated from acquisition data, the default value is arbitrary. Although the Preset/Default values are defined.
Dependencies	Unavailable when "Meas Method" on page 698 is set to RBW.
Preset	Result dependent on markers setup and signal source.
State Saved	No
Backwards Compatibility SCPI	`:CALCulate:ACPower: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

Backward Compatibility Remote Commands

Sets or queries the state of a marker. Setting a marker which is off to the on state or 1 puts it in Normal mode and places it at the center of the screen.

Mode	SA, WCDMA, WIMAXOFDMA, CDMA2K, TDSCDMA, CDMA1XEV, DVB, DTMB, ISDBT, CMMB, LTE, LTETDD, DCATV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:STATe OFF|ON|0|1` `:CALCulate:ACPower:MARKer[1]|2|...|12:STATe?`
Example	CALC:ACP:MARK2:STAT ON CALC:ACP:MARK2:STAT?
Notes	This parameter is also accessed from Marker, Properties, 1 You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|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 the ACP measurement. The front-panel key will display a blank key 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 ACP. The front-panel key will display 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 1867

"Current Measurement Query (Remote Command Only) " on page 1869

"Limit Test Current Results (Remote Command Only)" on page 1869

"Data Query (Remote Command Only)" on page 1869

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1870

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1875

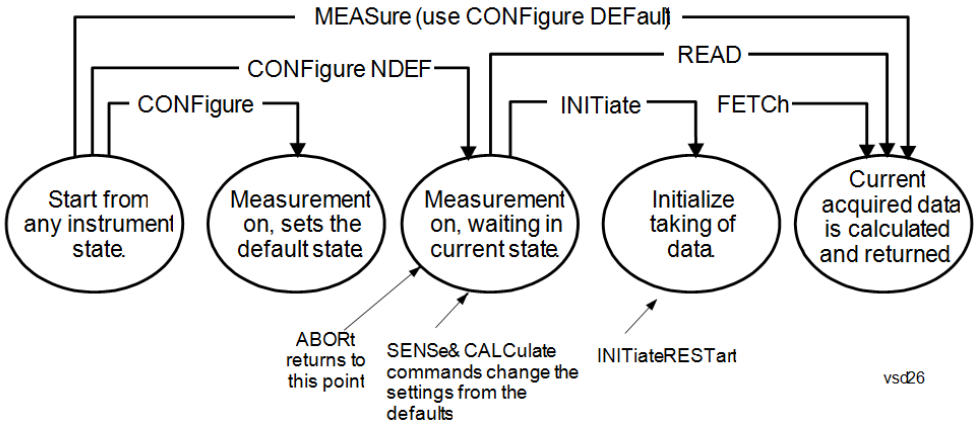
"Hardware-Accelerated Fast Power Measurement (Remote Command Only) " on page 1876

"Format Data: Numeric Data (Remote Command Only)" on page 1890

"Format Data: Byte Order (Remote Command Only)" on page 1891

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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} \text{Xi}$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} |\text{Xi}|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in region(s)} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

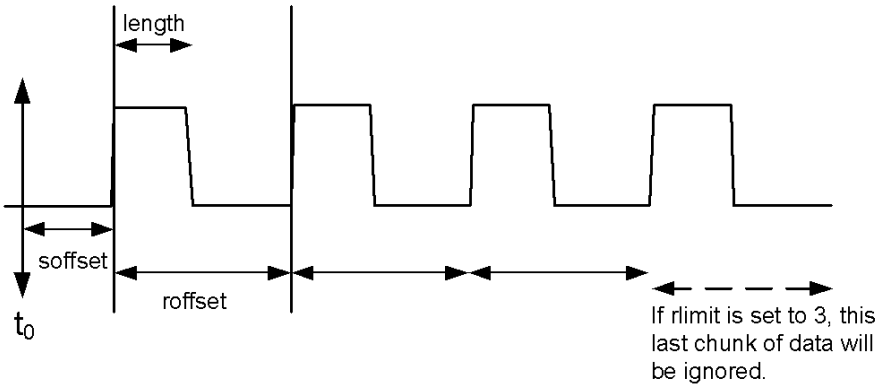
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

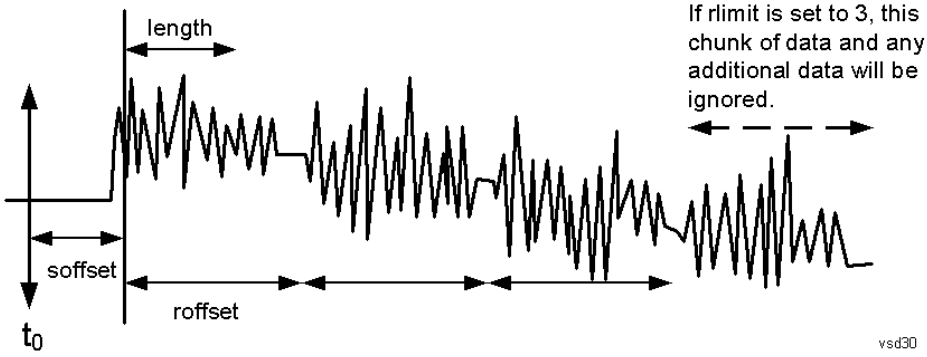
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

example	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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 functions included in the measurement setup menu include setting the parameters for the carriers, offsets, bandwidths, measurement methods and types. This menu also allows you to turn noise correction on and off.

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

Average/Hold Number

Specifies the number of measurement averages used to calculate the measurement result. The average will be displayed at the end of each sweep. 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, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:AVERage:COUNt <integer>`
	`[:SENSe]:ACPower:AVERage:COUNt?`
	`[:SENSe]:ACPower:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ACPower:AVERage[:STATe]?`

Example	ACP:AVER:COUN 250 ACP:AVER:COUN? ACP:AVER OFF ACP:AVER?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Backwards Compatibility SCPI	`[:SENSe]:ACPR:AVERage:COUNt` `[:SENSe]:MCPower:AVERage:COUNt (PSA Power Suite, PSA W-CDMA, PSA cdma2000 )`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Avg Mode

Enables you to set the averaging mode. 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 averaged value. The average will be 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, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:ACPower:AVERage:TCONtrol?`
Example	ACP:AVER:TCON EXP ACP:AVER:TCON?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Backwards Compatibility SCPI	`[:SENSe]:ACPR:AVERage:TCONtrol`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Setup (This menu is unavailable in MSR)

Accesses a menu that contains Carriers, Ref Carrier, Ref Car Freq, Ref Car Pwr and Configure Carriers.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

Carriers

Specifies the number of carriers to be measured.

Key Path	Meas Setup, Carrier Setup, Configure Carriers
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:COUNt <integer>` `[:SENSe]:ACPower:CARRier[1]|2:COUNt?`
Example	ACP:CARR:COUN 1 ACP:CARR:COUN?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. 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.
Dependencies	When Number of Carriers is 1, Ref Carrier is grayed out. If N9060A–5FP license is enabled, Max of Carrier is 18, otherwise, Max of Carrier is 12.
Couplings	Changing this parameter might affect the Span.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Refer to Dependencies item.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Carrier

Sets the reference carrier. Relative power measurements are made from the reference carrier.

If set to Auto, the measurement selects the carrier with the highest power as the reference carrier and the Ref Carrier parameter is updated. If a value is entered when Ref Carrier Mode is set to Auto, the mode changes to Man.

If set to Man, the value that you enter for the Ref Carrier is used as the reference carrier.

Key Path	Meas Setup, Carrier Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier <integer>`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier?`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:RCARrier:AUTO?`

Example	ACP:CARR:RCAR 1

	ACP:CARR:RCAR? ACP:CARR:RCAR:AUTO OFF ACP:CARR:RCAR:AUTO?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. 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.
Dependencies	If there is only one carrier, this key will be grayed out.
Couplings	If you enter a carrier value that is currently configured as having no power present, that carrier will be changed to having power present. If you enter a ref carrier this parameter will be set to manual.
Preset	Auto determined
State Saved	Saved in instrument state.
Min	1
Max	Number of available carriers
Backwards Compatibility SCPI	`[:SENSe]:MCPower:RCARrier[1]|2 (PSA Power Suite)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Ref Car Freq

Sets the reference carrier frequency.

Key Path	Meas Setup, Carrier Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency <freq>`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency?`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:RCFRequency:AUTO?`

Example	ACP:CARR:RCFR 250 MHz ACP:CARR:RCFR? ACP:CARR:RCFR:AUTO OFF

	ACP:CARR:RCFR:AUTO?
Notes	
	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS.
	Note that Carrier sub op code 2 is supported only in Non-SA modes.
	In the SA mode, Carrier sub op code 1 is used for both BTS and MS.
	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
	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
Couplings	LTE-Advanced FDD/TDD not supported the following couplings.
	Coupled to the Center Frequency.
	If the center frequency changes, the Ref Carrier Frequency is calculated using the following three steps;
	Ref Freq1 = Ctr Freq - (Total of all Carrier Widths / 2)
	Ref Freq2 = Ref Freq1 + (Total of all Carrier Widths up to Ref Carrier)
	Ref Freq = Ref Freq2 + (0.5 * Carrier Width of Ref Carrier)
	If reference carrier frequency changes the Center Frequency is calculated using the following three steps;
	Ctr Freq1 = Ref Freq - (0.5 * Carrier Width of Ref Carrier)
	Ctr Freq2 = Ctr Freq1 - (Total of all Carrier Widths up to Ref Carrier)
	Ctr Freq = Ctr Freq2 + (Total of all Carrier Widths / 2)
	This ensures that the carriers are always centered on the screen.
	If there is only one carrier present the Reference Carrier Frequency will be the same as the Center Frequency.
Preset	Calculated based on the current Center Frequency
State Saved	Saved in instrument state.
Min	–79.999995 MHz
Max	Hardware Dependent:
	Option F03 = 3.079999995 GHz
	Option F07 = 7.574999995 GHz
	Option F13 = 13.799999995 GHz
	Option F26 = 26.549999995 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Power Ref

Sets the power reference in the carrier that will be used to compute the relative values for the offsets.

Key Path	Meas Setup, Carrier Setup
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.04.00

Total Power

Sets the multi-carrier power reference.

When set to Auto, the carrier power result reflects the measured power value in the selected reference carrier.

When set to Man, the result is referenced to the last measured value, or you may specify the reference for the multi-carrier power measurement. Relative values are displayed, referenced to the “Power Reference” value.

Key Path	Meas Setup, Carrier Setup, Power Ref
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2[:POWer] <real>`
	`[:SENSe]:ACPower:CARRier[1]|2[:POWer]?`
	`[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe]?`

Example	ACP:CARR 10 ACP:CARR? ACP:CARR:AUTO OFF ACP:CARR:AUTO?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement. Carrier sub op code: 1 for BTS, 2 for MS. Default is BTS. Carrier sub op code 2 is supported only in Non-SA modes. MS is not supported in MSR.In the SA mode, Carrier sub op code 1 is used for both BTS and MS. The Unit Terminator keys differ depending on whether or not the mode supports Y Axis Unit and also which Y Axis Unit is selected. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. Power Ref State ([:SENSe]:ACPower:CARRier[1]|2:AUTO[:STATe]) is not available in MSR mode.
Dependencies	This key is available only when the Meas Type is TPRef. If the Meas Type is not TPRef, this key is grayed out.
Preset	0.0 ON
State Saved	Saved in instrument state.
Min	–200 dBm

Max	200 dBm
Backwards Compatibility SCPI	`[:SENSe]:MCPower:CARRier[1]|2[:POWer]`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00, A.10.00

PSD

Sets the power spectral density in the carrier (main channel) that is used to compute the relative power spectral density values for the offsets when Meas Type is set to PSD Ref. When the PSD Ref state is set to Auto, this will be set to the measured carrier power spectral density.

Key Path	Meas Setup, Carrier Setup, Power Ref
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:CPSD <real>` `[:SENSe]:ACPower:CARRier[1]|2:CPSD?`
Example	ACP:CARR:CPSD 25 ACP:CARR:CPSD?
Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. MS is not supported in MSR. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	This key is available only when the Meas Type is PSDRef. If the Meas Type is not PSDRef, this key is grayed out.
Couplings	The value of PSD is automatically converted when PSD Unit is changed.
Preset	0.0
State Saved	Saved in instrument state.
Min	–999
Max	999
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00, A.10.00

Configure Carriers

Accesses a menu that contains Carrier, Carrier Pwr Present, Carrier Width and Carrier Integ BW parameters.

Key Path	Meas Setup, Carrier Setup
Initial S/W Revision	Prior to A.02.00

Carrier

Selects the carrier to configure for the current measurement.

Key Path	Meas Setup, Carrier Setup, Configure Carriers
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Couplings	Max value is the number of available carriers, so this value might change when the number of carriers is changed.
Preset	1
State Saved	No
Min	1
Max	Number of available carriers
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Pwr Present

Configures the carriers for this measurement. It allows spaces to be inserted between carriers. Carriers with the power present parameter set to Yes are carriers, and those with the power present parameter set to No are spaces. Each carrier power present is set to Yes or No. The individual carriers can be set by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or numeric keypad, then toggling the carrier power present using the carrier power present menu key.

The query for this parameter returns the current values for all of the carriers. If a carrier is defined as having no power present, the power displayed will be relative to the reference carrier, otherwise the absolute power will be displayed.

If you change the carrier power present to no and that carrier is currently configured as the reference carrier, the next carrier to the left (or the right if there are no carriers to the left) will be assigned as the reference carrier. This also applies to the scenario where there are only two carriers configured as having power present and you configure only one carrier to have no power present.

Key Path	Meas Setup, Carrier Setup, Configure Carriers
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent YES | NO, YES | NO, YES | NO, YES | NO, YES | NO` `[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent?`
Example	ACP:CARR2:LIST:PPR YES ACP:CARR2:LIST:PPR?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. 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.
Dependencies	If there is only one carrier, this key will be grayed out.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes|No
Backwards Compatibility SCPI	`[:SENSe]:MCPower:CARRier[1]|2:LIST:PPResent (PSA Power Suite)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Spacing

Sets the width of the carrier spacing. This will be the value applied to all the current slots, whether they are carriers or spaces.

Enter each carrier spacing value individually by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or the numeric keypad, then enter the carrier width using the carrier spacing menu key.

Key Path	Meas Setup, Carrier Setup, Configure Carriers
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh?`
Example	ACP:CARR2:LIST:WIDT 25kHz ACP:CARR2:LIST:WIDT?

Notes	
	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. 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.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Spacing might affect the Span.
Preset	SA, WCDMA: 5 MHz WIMAX OFDMA: 10 MHz C2K: 1.25 MHz 1xEVDO: 1.25 MHz TD-SCDMA: 1.6 MHz DVB-T/H: 8 MHz DTMB (CTTB): 8 MHz ISDB-T: 6 MHz CMMB: 8 MHz LTE: 5 MHz LTETDD: 5 MHz Digital Cable TV: 8 MHz
State Saved	Saved in instrument state.
Min	0 Hz
Max	1 GHz
Backwards Compatibility SCPI	`[:SENSe]:MCPower:CARRier[1]|2:LIST:WIDTh (PSA Power Suite)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Measurement Noise Bandwidth

Specifies the Measurement Noise Bandwidth used to calculate the power in the carriers.

Each Measurement Noise Bandwidth value is entered individually by selecting the desired carrier on the carrier menu key using the up down arrows, the knob, or the numeric keypad. Then enter the measurement noise bandwidth using the measurement noise bandwidth key.

Key Path	Meas Setup, Carrier Setup, Configure Carriers
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]?`
Example	ACP:CARR2:LIST:BAND 25kHz ACP:CARR2:LIST:BAND?
Notes	In the WCDMA mode, the preset/default value is defined as 3.84 MHz. But internally, 4.6848 MHz is used as the default value. Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. 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.
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers is set to the number of entries in the parameter list.
Preset	SA: 2 MHz WCDMA: 3.84 MHz WIMAX OFDMA: 10 MHz C2K: 1.23MHz TD-SCDMA: 1.28 MHz 1xEVDO: 1.23 MHz DVB-T/H: 7.61 MHz DTMB (CTTB): 7.56 MHz ISDB-T: 5.6 MHz CMMB: 7.512 MHz LTE, LTETDD: 4.515 MHz|4.5 MHz Digital Cable TV: 8.0 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	1 GHz

Backwards Compatibility SCPI	`[:SENSe]:ACPower:BANDwidth:INTegration`
	`[:SENSe]:ACPower:BWIDth:INTegration`
	`[:SENSe]:ACPower:CARRier[1]|2:LIST:BWIDth[:INTegration]`

	[:SENSe]:MCPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] (PSA Power Suite) [:SENSe]:MCPower:CARRier[1]|2:LIST:BWIDth[:INTegration] (PSA Power Suite)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Carrier Coupling

Couples carrier settings to carrier #1. The coupled parameters are Carrier Power Present, Carrier Spacing, Measurement Noise Bandwidth, Method, and Filter Alpha.

Parameter Name	Carrier Coupling
Key Path	Meas Setup, Carrier Setup, Configure Carriers
Key Type	Binary
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, LTEAFDD, LTEATDD
Remote Command	[:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1 [:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle?
Example	ACP:CARR:LIST:COUP OFF ACP:CARR:LIST:COUP?
Notes	Carrier sub op code. 1 for BTS, 2 for MS. Default is BTS. Note that Carrier sub op code 2 is supported only in Non-SA modes. In the SA mode, Carrier sub op code 1 is used for both BTS and MS. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. 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.
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are Carrier Power Present, Carrier Spacing, Measurement Noise Bandwidth, Method and Filter Alpha. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
Force Restart	No
State Saved	Saved in instrument state.
Range	Couple|Man
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00
Softkey Label	Carrier

Offset/Limits

Accesses a menu of functions that contains Offset, Offset Freq/Offset To Edge, Offset Integ BW, Upper Offset Limit and Lower Offset parameters.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.13.00

Select Offset

Selects the offset to configure.

Key Path	Meas Setup, Offset/Limits, Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Preset	A
State Saved	Saved in instrument state.
Range	Offset A|Offset B|Offset C|Offset D|Offset E|Offset F
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Offset Freq

This parameter determines the frequency difference between the center of the main channel and the center of the carrier.

Each Offset Freq state value is entered individually by selecting the desired carrier on the carrier menu key using the up down arrows, RPG or numeric keypad. Then enter the Offset Freq State using the Offset Frequency key.

The list contains up to six (6) entries, depending on the mode selected, for offset frequencies. Each offset frequency in the list corresponds to a reference bandwidth in the bandwidth list.

An offset frequency of zero turns the display of the measurement for that offset off, but the measurement is still made and reported. You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet:LIST:STATe command.

Turning the offset off has the same effect as setting the frequency of the offset to 0 Hz and will cause it to be removed from the results screen.

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, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST[:FREQuency] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST[:FREQuency]?`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:STATe OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:STATe?`

Example	ACP:OFFS1:LIST 0,0,0,0,0,0 ACP:OFFS1:LIST? ACP:OFFS2:LIST:STAT 1,1,0,0,0,0 ACP:OFFS2:LIST:STAT?
Notes	The label for this menu key will change depending on the currently selected radio standard or mode. For cdma2000 the label for the menu key will be Offset to Edge. For all other supported standards the label will be Offset Freq. When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	Changing Offset Frequency might affect the Span. See the Span key section for details.
Preset	SA: 3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WCDMA: 5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WIMAX OFDMA: 10 MHz, 20 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 10 MHz, 20 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz C2K:750KHz, 1.980 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 885 kHz, 1.980 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz TD-SCDMA: 1.6 MHz, 3.2 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|1.6 MHz, 3.2 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz 1xEVDO: 750KHz, 1.98MHz, 3.125MHz, 4.000MHz, 7.500MHz, 7.500MHz|885KHz, 1.98MHz, 3.125MHz, 4.000MHz, 7.500MHz, 7.500MHz DVB-T/H: 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz DTMB (CTTB): 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz ISDB-T: 6 MHz, 12 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz| 6 MHz, 12 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz CMMB: 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz| 8 MHz, 16 MHz, 24 MHz, 32 MHz, 0 Hz, 0 Hz LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 5 MHz, 10 MHz, 0, 0, 0, 0|5 MHz, 10 MHz, 0, 0, 0, 0 Digital Cable TV: 8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz|8 MHz, 16 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz SA: ON, OFF, OFF, OFF, OFF, OFF|ON, OFF, OFF, OFF, OFF, OFF WCDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF WIMAX OFDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF TD-SCDMA: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF DVB-T/H: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF

	DTMB (CTTB): ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF CDMA1xEVDO: ON, ON, OFF, OFF, OFF, OFF| ON, ON, OFF, OFF, OFF, OFF ISDB-T: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF CMMB: ON, ON, ON, ON, OFF, OFF|ON, ON, ON, ON, OFF, OFF LTE, LTETDD, MSR, LTEAFDD, LTEATDD: ON, ON, OFF, OFF, OFF, OFF|ON, OFF, OFF, OFF, OFF, OFF Digital Cable TV: ON, ON, OFF, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	0 Hz
Max	500 MHz
Backwards Compatibility SCPI	`[:SENSe]:MCPower:OFFSet[1]|2:LIST[:FREQuency] (PSA Power Suite)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Integ BW

Sets the Integration Bandwidth for the offsets. Each resolution bandwidth in the list corresponds to an offset frequency in the list defined by [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST[:FREQuency].

Enter each value individually by selecting the desired offset on the offset menu key using the up down arrows, the knob, or the numeric keypad, then enter the Offset Integration Bandwidth using the Offset Integration Bandwidth menu key.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:STATe command.

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, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:INTegration] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth[:INTegration]?`
Example	ACP:OFFS2:LIST:BAND 2MHz, 2MHz, 2MHz, 2MHz, 2MHz, 2MHz ACP:OFFS2:LIST:BAND?
Notes	When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted i.e. if you want to change the second value, you must send all values up to it. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Couplings	Changing Integ BW might affect the Span. See Span section for details.
Preset	SA: 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz|2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz WCDMA: 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz|3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz WIMAX OFDMA: 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz| 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz, 10 MHz C2K: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz|30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz TD-SCDMA: 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz, 1.28 MHz 1xEVDO: C2K: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz|30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz DVB-T/H: 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz| 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz, 7.61 MHz DTMB (CTTB): 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz| 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz, 7.56 MHz ISDB-T: 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz| 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz, 5.6 MHz CMMB: 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz| 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz, 7.512 MHz LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz, 4.515 MHz|4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz, 4.5 MHz Digital Cable TV: 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz| 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz, 8.0 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	1 GHz

Backwards Compatibility SCPI	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth[:INTegration]`
	`[:SENSe]:ACPR:OFFSet[1]|2:LIST:BANDwidth`
	`[:SENSe]:ACPR:OFFSet[1]|2:LIST:BWIDth`
	`[:SENSe]:MCPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration] (PSA Power Suite)`
	`[:SENSe]:MCPower:OFFSet[1]|2:LIST:BWIDth[:INTegration] (PSA Power Suite)`

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Offset BW

Accesses the offset bandwidth menu.

Key Path	Meas Setup, Offset/Limits
Initial S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

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, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution?`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution:AUTO ON | OFF | 1 | 0, ON | OFF | 1 | 0, ON | OFF | 1 | 0, ON | OFF | 1 | 0, ON | OFF | 1 | 0, ON | OFF | 1 | 0`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:RESolution:AUTO?`

Example	ACP:OFFS2:LIST:BAND:RES 220kHz, 220kHz, 220kHz, 220kHz, 220kHz, 220kHz ACP:OFFS2:LIST:BAND:RES? ACP:OFFS2:LIST:BAND:RES:AUTO 1,1,1,1,1,1 ACP:OFFS2:LIST:BAND:RES:AUTO?
Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	When Res BW Mode is AUTO, this value is exactly same as Res BW under BW key. And when this value is changed by user, Res BW Mode is also changed to Man.
Preset	SA: 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz WCDMA: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz WIMAX OFDMA: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz C2K: Method:RBW 30 kHz Method: IBW C2K: 15 kHz, 15 kHz, 15 kHz, 15 kHz, 15 kHz, 15 kHz|15 kHz, 15 kHz, 15 kHz, 15 kHz, 15 kHz, 15 kHz TD-SCDMA: 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz, 30 kHz 1xEVDO: 30KHz, 30KHz, 30KHz, 30KHz, 30KHz, 30KHz |30KHz, 30KHz, 30KHz, 30KHz, 30KHz, 30KHz

	DVB-T/H: 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz DTMB (CTTB): 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz ISDB-T: 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz CMMB: 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100kHz, 100 kHz|100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz Digital Cable TV: 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz|39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz, 39 kHz 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Backwards Compatibility SCPI	`[:SENSe]:ACPower: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.13.00

Video BW

Enables you to change the analyzer post-detection filter (VBW).

Key Path	Meas Setup, Offset/Limits, Offset BW
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo?`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1, OFF | ON | 0 | 1`
	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:VIDeo:AUTO?`

Example	ACP:OFFS2:LIST:BAND:VID 5MHz, 5MHz, 5MHz, 5MHz, 5MHz, 5MHz ACP:OFFS2:LIST:BAND:VID? ACP:OFFS2:LIST:BAND:VID:AUTO 0,0,0,0,1,1 ACP:OFFS2:LIST:BAND:VID:AUTO?
Notes	The values shown in this table reflect the conditions after a Mode Preset. Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode. .
Dependencies	When Meas Method is RBW or FAST, this key is grayed out and disabled. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	SA: 22 kHz, 22 kHz, 22 kHz, 22 kHz, 22 kHz, 22 kHz WCDMA, WIMAX OFDMA: 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz C2K: 150 kHz, 150 kHz, 150 kHz, 150 kHz, 150 kHz, 150 kHz| 150 kHz, 150 kHz, 150 kHz, 1150 kHz, 1150 kHz, 150 kHz TD-SCDMA: 300 kHz, 300 kHz, 300 kHz, 300 kHz, 300 kHz, 300 kHz 1xEVDO: 300KHz, 300KHz, 300KHz, 300KHz, 300KHz, 300KHz | 300KHz, 300KHz, 300KHz, 300KHz, 300KHz, 300KHz DVB-T/H: 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz DTMB (CTTB): 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz ISDB-T: 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz CMMB: 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz, 1 MHz Digital Cable TV: 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz|390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz, 390 kHz ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Backwards Compatibility SCPI	`[:SENSe]:ACPower: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.13.00

RBW Control

Accesses the resolution bandwidth control menu.

Key Path	Meas Setup, Offset/Limits, Offset BW
Initial S/W Revision	Prior to A.02.00

Filter Type

Selects the type of bandwidth filter that is used.

Key Path	Meas Setup, Offset/Limits, Offset BW, RBW Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:SHAPe GAUSsian | FLATtop, GAUSsian | FLATtop, GAUSsian | FLATtop, GAUSsian | FLATtop, GAUSsian | FLATtop, GAUSsian | FLATtop` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:SHAPe?`
Example	ACP:OFFS2:LIST:BAND:SHAP FLAT, GAUS, GAUS, GAUS, GAUS, GAUS ACP:OFFS2:LIST:BAND:SHAP?
Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Res BW Mode for the offset is Auto, this key is grayed out and disabled. Since Res BW Mode for the offset is preset to Auto on changing Meas Method to RBW or FAST, this key is grayed out and disabled too. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Couplings	See the description above
Preset	GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian
State Saved	Saved in instrument state.
Range	GAUSsian|FLATtop
Backwards Compatibility SCPI	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:SHAPe`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Filter BW

Selects a Gaussian filter based on its –3 dB (Normal) bandwidth or its –6 dB bandwidth.

Key Path	Meas Setup, Offset/Limits, Offset BW, RBW Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:TYPE DB3 | DB6, DB3 | DB6, DB3 | DB6, DB3 | DB6, DB3 | DB6, DB3 | DB6` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:TYPE?`
Example	ACP:OFFS2:LIST:BAND:TYPE DB3, DB3, DB3, DB3, DB3, DB3 ACP:OFFS2:LIST:BAND:TYPE?

Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When Filter Type if Flattop or Res BW Mode for the offset is Auto, this key is grayed out and disabled. Since Res BW Mode for the offset is preset to Auto on changing Meas Method to RBW or FAST, this key is grayed out and disabled too. If the key is pressed, an advisory message is generated. If the equivalent remote command is sent, a "Setting conflict" warning is generated.
Preset	DB3, DB3, DB3, DB3, DB3, DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)| –6 dB
Backwards Compatibility SCPI	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BWIDth:TYPE`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Limits

Limits key accesses a menu of functions that contains Select Offset, Abs Limit, Rel Limit and Fail Mask parameters.

Key Path	Meas Setup, Offset/Limits
Initial S/W Revision	A.03.00

Select Offset

Selects the offset to configure.

Key Path	Meas Setup, Offset/Limits, Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Preset	A
State Saved	Saved in instrument state.
Range	Offset A|Offset B|Offset C|Offset D|Offset E|Offset F
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Abs Limit

Enters an absolute limit value, which sets the absolute amplitude levels to test against for each of the custom offsets. The list must contain six (6) entries. If there is more than one offset, the offset closest to the carrier channel is the first one in the list. [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:STATe command.

The query returns the six (6) sets of real numbers that are the current absolute amplitude test limits.

Key Path	Meas Setup, Offset/Limits, Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR,LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:ABSolute <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:ABSolute?`
Example	ACP:OFFS2:LIST:ABS –10, –10, –10, –10, –10, –10 ACP:OFFS2:LIST:ABS?
Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from position 2 to position 4 are coupled, changing any one will change the others.
Preset	SA: 0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm|0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm WCDMA: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm C2K: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm WIMAX OFDMA: 50,50,50,50,50,50 TD-SCDMA: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm 1xEVDO: –27dBm, –27dBm, –13dBm, –13dBm, –13dBm, –13dBm |–27dBm, –27dBm, –13dBm, –13dBm, –13dBm, –13dBm DVB-T/H: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm DTMB (CTTB): 11.14 dBm, 11.14dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm|11.14 dBm, 11.14 dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm ISDB-T: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm CMMB: 11.14 dBm, 11.14dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm|11.14 dBm, 11.14 dBm, 11.14 dBm, 11.14 dBm, 50 dBm, 50 dBm LTE, LTETDD, MSR, LTEAFDD, LTEATDD: –8.45, –8.45, –8.45, –8.45, –8.45, –8.45|–50.0, –50.0, –

	50.0, –50.0, –50.0, –50.0 Digital Cable TV: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm|50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm
State Saved	Saved in instrument state.
Min	–200.0 dBm
Max	50.0 dBm
Backwards Compatibility SCPI	`[:SENSe]:ACPR:OFFSet[1]|2:LIST:ABSolute (PSA W-CDMA, PSA cdma2000 )` `[:SENSe]:MCPower:OFFSet[1]|2:LIST:ABSolute (PSA W-CDMA)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Rel Lim (Car)

Enters a relative limit value for the carrier level. This sets the amplitude levels to test against for the specified offsets.

The amplitude level is relative to the carrier amplitude. If multiple offsets are available, the list contains six (6) entries. The offset closest to the carrier channel is the first one in the list.

[:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:STATe command.

The query returns the six (6) sets of real numbers that are the current amplitude test limits, relative to the carrier, for each offset.

Offset[n] n = 1 is base station and n = 2 is mobiles. The default is base station (1).

Key Path	Meas Setup, Offset/Limits, Limits,
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RCARrier <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RCARrier?`
Example	ACP:OFFS2:LIST:RCAR 0,0,0,0,0,0 ACP:OFFS2:LIST:RCAR?
Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from

	position 2 to position 4 are coupled, changing any one will change the others.
Preset	SA: –45, –60, 0 , 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2 , –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50,–60,0,0,0,0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43 , –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0 , 0, 0, 0|–60, –60, 0, 0, 0, 0 DTMB (CTTB): –45, –60, –60 , –60, 50, 50|–45, –60, –60, –60, 50, 50 ISDB-T: –60, –60, 0 , 0, 0, 0|–60, –60, 0, 0, 0, 0 CMMB: –45, –60, –60 , –60, 50, 50|–45, –60, –60, –60, 50, 50 LTE, LTETDD, MSR, LTEAFDD, LTEATDD: –44.2, –44.2, –44.2, –44.2, –44.2, –44.2|–29.2, –29.2, –29.2, –29.2, –29.2, –29.2 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73
State Saved	Saved in instrument state.
Min	–150
Max	50.0
Backwards Compatibility SCPI	`[:SENSe]:MCPower:OFFSet[1]|2:LIST:RCARrier (PSA WCDMA)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00, A.13.00

Positive Offset Limit (SCPI only)

Enables you to set the upper limit for the upper segment of the specified offset pair.

Mode	SA, WCDMA, CDMA2K, WIMAXOFDMA, TDSCDMA, CDMA1XEV, DVB, DTMB, LTE, LTETDD, DCATV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:POSitive[:UPPer]:DATA <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:POSitive[:UPPer]:DATA?`
Example	CALC:ACP:OFFS:LIST:LIM:POS:DATA 0, 0, 0, 0, 0, 0 CALC:ACP:OFFS:LIST:LIM:POS:DATA?
Notes	SCPI only command
Preset	SA: –45, –60, 0, 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2, –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50, –60, 0, 0 ,0, 0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43, –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0, 0, 0, 0|–60, –60, 0, 0, 0, 0

	DTMB (CTTB): –45, –60, –60, –60, 0, 0|–45, –60, –60, –60, 0, 0 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73 LTE, LTETDD, MSR, LTEAFDD, LTEATDD: –44.2, –44.2, –44.2, –44.2, –44.2, –44.2|–29.2, –29.2, –29.2, –29.2, –29.2, –29.2
State Saved	Saved in instrument state.
Min	–150.0
Max	50.0
Backwards Compatibility SCPI	`:CALCulate:MCPower:OFFSet:LIST:LIMit:POSitive[:UPPer]:DATA (PSA Power Suite)`
Initial S/W Revision	A.04.00
Modified at S/W Revision	A.13.00

Negative Offset Limit

Enables you to set the upper limit for the lower segment of the specified offset pair.

Mode	SA, WCDMA, CDMA2K, WIMAXOFDMA, TDSCDMA, CDMA1XEV, DVB, DTMB, LTE, LTETDD, DCATV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:NEGative[:UPPer]:DATA <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:ACPower:OFFSet[:OUTer]:LIST:LIMit:NEGative[:UPPer]:DATA?`
Example	CALC:ACP:OFFS:LIST:LIM:NEG:DATA 0, 0, 0, 0, 0, 0 CALC:ACP:OFFS:LIST:LIM:NEG:DATA?
Notes	SCPI only command
Preset	SA: –45, –60, 0, 0, 0, 0|–45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2|–32.2, –42.2, –42.2, –42.2, –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 WIMAX OFDMA: –50, –60, 0, 0, 0, 0 TD-SCDMA: –40, –45, –45, –45, –45, –45|–33, –43, –43, –43, –43, –43 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60, –60, 0, 0, 0, 0|–60, –60, 0, 0, 0, 0 DTMB (CTTB): –45, –60, –60, –60, 0, 0|–45, –60, –60, –60, 0, 0 Digital Cable TV: –58, –62, –65, –73, –73, –73|–58, –62, –65, –73, –73, –73 LTE, LTETDD, MSR, LTEAFDD, LTEATDD: –44.2, –44.2, –44.2, –44.2, –44.2, –44.2|–29.2, –29.2, –29.2, –29.2, –29.2, –29.2
State Saved	Saved in instrument state.
Min	–150.0
Max	50.0
Backwards Compatibility SCPI	`:CALCulate:MCPower:OFFSet:LIST:LIMit:NEGative[:UPPer]:DATA (PSA Power Suite)`

Initial S/W Revision	A.04.00
Modified at S/W Revision	A.13.00

Rel Limit (PSD)

Enters a relative limit value for the level of the power spectral density. This sets the amplitude levels to test against for any custom offsets. The amplitude level is relative to the power spectral density. If multiple offsets are available, the list contains six (6) entries. The offset closest to the carrier channel is the first one in the list.

[:SENSe]:ACP:OFFSet[n][:OUTer] :LIST:TEST selects the type of testing to be done at each offset.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n][:OUTer] :LIST:STATe command.

The query returns the six (6) sets of real numbers that are the current amplitude test limits, relative to the power spectral density, for each offset.

Offset[n] n = 1 is base station and n = 2 is mobiles. The default is base station (1).

Key Path	Meas Setup, Offset/Limits, Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RPSDensity <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:RPSDensity?`
Example	ACP:OFFS2:LIST:RPSD 10,10,10,10,10,10 ACP:OFFS2:LIST:RPSD?
Notes	Offset sub op code. 1 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 ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: –28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB|–28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB WCDMA: –44.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB|–32.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB C2K: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB|0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB WIMAX OFDMA: –25,–35,0,0,0,0 TD-SCDMA: –40 dB, –45 dB, –45 dB, –45 dB, –45 dB, –45 dB|–33 dB, –43 dB, –43 dB, –43 dB, –43 dB, –43 dB 1xEVDO: –45, –55, –55, –55, –55, –55|–45, –55, –55, –55, –55, –55 DVB-T/H: –60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB|–60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB DTMB (CTTB): 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB ISDB-T: –60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB|–60 dB, –60 dB, 0 dB, 0 dB, 0 dB, 0 dB CMMB: 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB

	LTE, LTETDD, MSR, LTEAFDD, LTEATDD: 0, 0, 0, 0, 0, 0|0, 0, 0, 0, 0, 0 Digital Cable TV: 50 dB, 50 dB, 50 dB, 50 dB, 50 dB, 50 dB|50 dB, 50dB, 50 dB, 50 dB, 50 dB, 50 dB
State Saved	Saved in instrument state.
Min	–150.0 dB
Max	50.0 dB
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.13.00

Fail Mask

Accesses a menu that enables you to select one of the logic keys for the fail conditions between the measurement results and the test limits. The setting defines the type of testing to be done at any custom offset frequencies. The measured powers are tested against the absolute values defined with [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:ABSolute, or the relative values defined with [:SENSe]:ACP:OFFSet [n][:OUTer]:LIST:RPSDensity and [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:RCARrier.

You can turn off (not use) specific offsets with the [:SENSe]:ACP:OFFSet[n][:OUTer]:LIST:STATe command.

- Absolute – Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit.
- Relative – Fail is shown if one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).
- Abs AND Rel – Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit AND one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).
- Abs OR Rel– Fail is shown if one of the absolute ACP measurement results is larger than the limit for Abs Limit OR one of the relative ACP measurement results is larger than the limit for Rel Lim (Car) or Rel Lim (PSD).

Key Path	Meas Setup, Offset/Limits, Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:TEST ABSolute | AND | OR | RELative, ABSolute | AND | OR | RELative, ABSolute | AND | OR | RELative, ABSolute | AND | OR | RELative, ABSolute | AND | OR | RELative, ABSolute | AND | OR | RELative` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:TEST?`
Example	ACP:OFFS2:LIST:TEST ABS, ABS, ABS, ABS, ABS, ABS ACP:OFFS2:LIST:TEST?
Notes	Offset sub op code. 1 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.

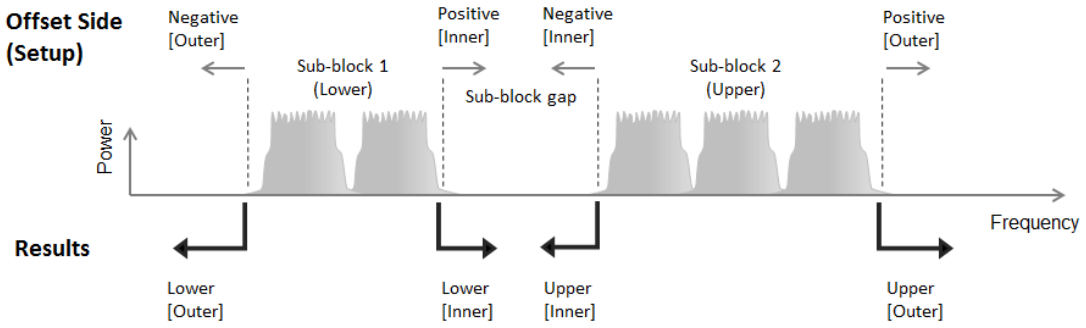
	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	None If current mode is DTMB (CTTB) or CMMB and current device type is Transmitter, the value from position 2 to position 4 are coupled, changing any one will change the others.
Preset	SA, WCDMA, C2K, TD-SCDMA: REL, REL, REL, REL, REL, REL|REL, REL, REL, REL, REL, REL WIMAX OFDMA: REL, REL, REL, REL, REL, REL DVB-T/H: REL, REL, REL, REL, REL, REL DTMB (CTTB): OR,AND, AND,AND, REL, REL CDMA1xEVDO: REL, REL, ABS, REL, REL, REL| REL, REL, ABS, REL, REL, REL ISDB-T : REL, REL, REL, REL, REL, REL CMMB : OR,AND, AND,AND, REL, REL LTE, LTETDD, MSR, LTEAFDD, LTEATDD: AND, AND, AND, AND, AND, AND|AND, AND, AND, AND, AND, AND Digital Cable TV: REL, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute|Relative|Abs AND Rel (fail if both fail)|Abs OR Rel (fail if either fails)
Backwards Compatibility SCPI	`[:SENSe]:MCPower:OFFSet[1]|2:LIST:TEST`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00, A.04.00, A13.00

Offset Side

Enables you to turn off (not use) specific offsetswith [:SENSe]:ACPower:OFFSet[1]|2[:Outer]:LIST:SIDE.

- NEGative - Negative (lower) sideband only
- BOTH - Both of the negative (lower) and positive (upper) sidebands
- POSitive - Positive (upper) sideband only

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.



Key Path	Meas Setup, Offset/Limits
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DTMB (CTTB), DVB-T/H, LTE, LTETDD, Digital Cable TV, MSR,LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:SIDE NEGative | BOTH | POSitive,NEGative | BOTH | POSitive,NEGative | BOTH | POSitive,NEGative | BOTH | POSitive,NEGative | BOTH | POSitive,NEGative | BOTH | POSitive` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:LIST:SIDE?`
Example	ACP:OFFS:LIST:SIDE BOTH ACP:OFFS:LIST:SIDE?
Notes	OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode, TD-SCDMA mode, DTMB (CTTB) mode, DVB-T/H mode, ISDB-T mode, CMMB mode, Digital Cable TV mode, 1xEVDO mode, WIMAX OFDMA mode, LTE mode, LTETDD ,LTEAFDD,LTEATDD or MSR mode to use this command. Use :INSTrument:SELect to set the mode. If you set POS or NEG in an offset, result of the inactive side will return –999.
Preset	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	A.03.00
Modified at S/W Revision	A.13.00

Offset Frequency Define

This key allows you to select “Offset” definition. Each standard defines each “Offset” from Carrier.

3GPP2 requires the “From Carrier Center to MeasBW Closer Edge” definition. LTE conformance test requires “From Carrier Edge to MeasBW Center” and/or “From Carrier Edge to MeasBW Closer Edge” definition.

- CTOCenter – From the center of the carrier closest to the adjacent channel to the center of the adjacent channel Offset Integ BW
- CTOEdge - From the center of the carrier closest to the adjacent channel to the edge of the closest adjacent channel Offset Integ BW
- ETOCenter – From Center Frequency - Carrier Spacing / 2 (for lower offset), Center Frequency + Carrier Spacing / 2 (for upper offset) of the carrier closest to the adjacent channel's to the center of the adjacent channel Offset Integ BW
- ETOEdge - From Center Frequency - Carrier Spacing / 2 (for lower offset), Center Frequency + Carrier Spacing / 2 (for upper offset) of the carrier closest to the adjacent channel's to the edge of the closest adjacent channel Offset Integ BW

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, MSR,LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:TYPE CTOCenter | CTOEdge | ETOCenter | ETOEdge` `[:SENSe]:ACPower:OFFSet[1]|2[:OUTer]:TYPE?`
Example	ACP:OFFS:TYPE ETOC ACP:OFFS:TYPE?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	All Except C2K and 1xEVDO: CTOCenter C2K and 1xEVDO: CTOEdge
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
Modified at S/W Revision	A.13.00

Carrier Result

Allows you to view and scroll through the carrier power results.

Key Path	Meas Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA. 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Couplings	This key will be grayed out if there is only one carrier.
Preset	1
State Saved	No
Min	1
Max	Number of carriers.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Method

Sets the desired method to measure ACP.

Integration BW – one sweep of the trace is taken, and the band power for each offset is computed. Depending on the status of the Meas Type parameter (Total Power Reference or PSD Reference), results are displayed relative to the total power or the power spectral density. The display reflects either the current trace or a bar graph view.

Filtered IBW (max dynamic range) – the ACP Path is used to compute ACP when an ACP path is available. This method increases dynamic range, but increases measurement time as it limits the resolution bandwidth. This method is useful for improving dynamic range on a W-CDMA signal because a sharp cutoff bandpass filter is used. The accuracy of the adjacent channel power ratio is not degraded by this method, but the absolute accuracy of both adjacent channel power and carrier power are degraded by up to about 0.5 dB.

RBW – the algorithm uses zero-span and an appropriate RBW setting to capture all of the power in the carrier channel and the offsets. The zero-span algorithm (RBW method) is slower than the IBW method, but greatly improves repeatability.

Fast (in WCDMA mode or SA mode with 3GPP WCDMA radio standard selected) – this provides the same method as the Integration BW method, but is optimized for speed to measure a W-CDMA signal.

Fast (in CDMA2K mode or SA mode with CDMA2K radio standard selected) – this provides faster measurement using the FFT method with a limited parameter flexibility. When this is selected, CDMA2K preset offsets are given and control of the following are grayed out:

BW menu, Sweep/Control menu except Pause/Resume, Trace/Detector menu, Carrier Setup, Offset Limit, RRC Weighting, Filter Alpha, and Noise Correction softkeys in Meas Setup menu.

Key Path	Meas Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR,, LTEAFDD, LTEATDD
Remote Command	`[:SENSe]:ACPower:METHod IBW|IBWRange|FAST|RBW` `[:SENSe]:ACPower:METHod?`
Example	ACP:METH IBW ACP:METH?
Notes	FAST mode is only supported for WCDMA and C2K signal. You must be in the WCDMA or C2K mode or SA mode with 3GPP WCDMA or CDMA2K radio standard. Otherwise a setting conflict error message will be reported. In the TDSCDMA mode, only the IBW method is available to use. Therefore, the measure method key is not displayed in the TD-SCDMA mode. CDMA1xEVDO mode only supports RBW and Integration BW method. C2K mode only supports RBW, Integration BW and FAST method. LTETDD mode only supports Integration BW and Filtered IBW method. MSR mode only supports Integration BW and Filtered IBW method. LTE-Advanced FDD/TDD mode only support IBW and Filtered IBW method. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When RBW or FAST is selected, Gate function is not available. If you try to turn Gate On while Meas Method is RBW or FAST, an error is generated. When Gate function is ON, RBW and FAST method is not available. If you try to change Meas Method to RBW or FAST, an error is generated.
Couplings	IBW (Range) restricts the Res BW available for making this measurement to 30 kHz. When selected, the Res BW is clipped to this value if required and an error number displayed.

Preset	SA, LTE, LTETDD, MSR, LTEAFDD, LTEATDD: IBW WCDMA: IBW C2K: RBW WIMAX OFDMA: IBW 1xEVDO: IBW DVB-T/H: IBW DTMB (CTTB): IBW ISDB-T: IBW CMMB: IBW Digital Cable TV: IBW
State Saved	Saved in instrument state.
Range	Integration BW|Filtered IBW (max dynamic range)|RBW|Fast
Readback Text	IBW|Filtered IBW|RBW|Fast
Backwards Compatibility SCPI	`[:SENSe]:ACPR:SWEep:TYPE` `[:SENSe]:MCPower:METHod (PSA Power Suite)`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Meas Type

Changes the reference used for the measurement. This allows you to make absolute and relative power measurements of either total power or the power normalized to the measurement bandwidth.

Total Pwr Ref (TPR) sets the reference to the total carrier power. PSD Ref (PSDR) sets the reference to the power spectral density of the carrier.

Key Path	Meas Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:TYPE TPRef|PSDRef` `[:SENSe]:ACPower:TYPE?`
Example	ACP:TYPE PSDR ACP:TYPE?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	TPRef
State Saved	Saved in instrument state.
Range	Total Power Ref|PSD Ref
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

PSD Ref

Sets the unit bandwidth for Power Spectral Density. The available units are dBm/Hz and dBm/MHz.

Key Path	Meas Setup
Mode	A, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:UNIT:ACPower:POWer:PSD DBMHZ|DBMMHZ` `:UNIT:ACPower:POWer:PSD?`
Example	UNIT:ACP:POW:PSD DBMMHZ UNIT:ACP:POW:PSD?
Couplings	When the PSD unit is changed, the PSD reference result of the “MEAS|READ|FETCH:ACP[n]?” is also changed by the PSD unit basis (in either dBm/Hz or dBm/MHz).
Preset	DBMHZ
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

Limit Test

Turns limit checking for each offset On or Off. The limits may be specified within the Offset menu, for each offset, both sides of the carrier. For results that fail the limit, a red F is appended. In the Combined view, the bar turns red.

Key Path	Meas Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:LIMit:STATe OFF|ON|0|1` `:CALCulate:ACPower:LIMit:STATe?`
Example	CALC:ACP:LIM:STAT OFF CALC:ACP:LIM:STAT?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: OFF WCDMA: ON C2K: ON WIMAX OFDMA: OFF TD-SCDMA: ON 1xEVDO: ON DVB-T/H: OFF DTMB (CTTB): ON

	ISDB-T: OFF CMMB: ON LTE, LTETDD, MSR, LTEAFDD, LTEATDD: ON Digital Cable TV: OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	`[:SENSe]:MCPower:LIMit[:STATe]` `[:SENSe]:ACPower:LIMit[:STATe]`
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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CONFigure:ACPower`
Example	CONF:ACP
Notes	You must be in the mode that includes ACP measurements 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

Offset RRC Weighting (Backward Compatibility SCPI)

Mode	SA, WCDMA, TD-SCDMA, WIMAX OFDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:ACPower:FILTer[:RRC][:STATe]?`
Example	ACP:FILT OFF ACP:FILT?
Notes	This parameter is not available for cdma2000 and 1xEVDO The backwards Compatibility SCPI command, [:SENSe]:ACPR:FILTer[:RRC][:STATe], is provided to support same functionality as [:SENSe]:ACPr:FILTer[:RRC][:STATe] (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to ACPr node conflicts with ACPower node. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.

Couplings	This command is an alias to [:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer[:RRC][:STATe] Sending the commands to set values of all offsets for BS and MS, however, sending the query always return a value of BS Offset A.
Preset	SA, WIMAX OFDMA, LTE, LTETDD, MSR: OFF WCDMA: ON C2K: NO TD-SCDMA: ON DVB-T/H: OFF DTMB (CTTB):ON ISDB-T: OFF CMMB: OFF Digital Cable TV: ON LTEAFDD,LTEATDD: OFF
State Saved	Saved in instrument state.
Backwards Compatibility SCPI	`[:SENSe]:ACPR:FILTer[:RRC][:STATe]` `[:SENSe]:MCPower:FILTer[:RRC][:STATe]`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Offset Filter Alpha (Backward Compatibility SCPI)

Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:ACPower:FILTer[:RRC]:ALPHa?`
Example	ACP:FILT:ALPH 0.5 ACP:FILT:ALPH?
Notes	This parameter is not available for cdma2000 and 1xEVDO The backwards Compatibility SCPI command, [:SENSe]:ACPR:FILTer[:RRC]:ALPHa, is provided to support same functionality as [:SENSe]:ACPr:FILTer[:RRC]:ALPHa (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to ACPr node conflicts with ACPower node. You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	This command is an alias to [:SENSe]:ACPower:OFFSet[1]|2:LIST:FILTer:ALPhHa Sending the commands to set values of all offsets for BS and MS, however, sending the query always return a value of BS Offset A.
Preset	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, ISDB-T, CMMB, LTE, LTETDD, MSR: 0.22

	C2K: NO DTMB (CTTB): 0.05 Digital Cable TV: 0.15 LTEAFDD,LTEATDD: 0.22
State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Backwards Compatibility SCPI	`[:SENSe]:ACPR:FILTer[:RRC]:ALPHa` `[:SENSe]:MCPower:FILTer[:RRC]:ALPHa`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Method for Carrier (Backward Compatibility SCPI)

Mode	SA, WCDMA, WIMAX OFDMA, TD-SCDMA, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod IBW|RRC, …` `[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod?`
Example	ACP:CARR2:LIST:METH RRC ACP:CARR2:LIST:METH?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode. Maximum of Array length depends on the number of carriers.
Couplings	This command is an alias to [:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer[:RRC][:STATe] The enum value translates as follows: RRC Weighted = 1|ON Integ BW = 0|OFF Maximum of Array length depends on the number of carriers.
Preset	SA: IBW WCDMA: RRC WIMAX OFDMA: IBW TD-SCDMA: RRC DVB-T/H: IBW DTMB (CTTB): RRC ISDB-T: IBW CMMB: IBW LTE, MSR: IBW LTETDD: IBW

	Digital Cable TV: RRC
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Mode

See "Mode" on page 200

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 708 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 219

Peak Search

Places the selected marker on the trace point with the maximum y-axis value.

Key Path	Peak Search
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum`
Example	CALC:ACP:MARK2:MAX
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude.

Key Path	Peak Search
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:NEXT`
Example	CALC:ACP:MARK2:MAX:NEXT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Pk Right

Moves the selected marker to the nearest peak to the right of the current marker that meets all enabled peak criteria.

Key Path	Peak Search
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:RIGHt`
Example	CALC:ACP:MARK2:MAX:RIGH
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Next Pk Left

Moves the selected marker to the nearest peak to the left of the current marker that meets all enabled peak criteria.

Key Path	Peak Search
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MAXimum:LEFT`
Example	CALC:ACP:MARK2:MAX:LEFT
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Marker Delta

Sets the control mode for the selected marker to Delta mode.

See Marker Delta in the "Marker Functions" section for more information.

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
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:PTPeak`
Example	CALC:ACP:MARK:PTP
Notes	Turns on the Marker Δactive function.
Couplings	This key is not available (key is grayed out) when Coupled Markers is on.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	Peak Search
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|...|12:MINimum`
Example	CALC:ACP:MARK:MIN
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 229

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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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 719.

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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

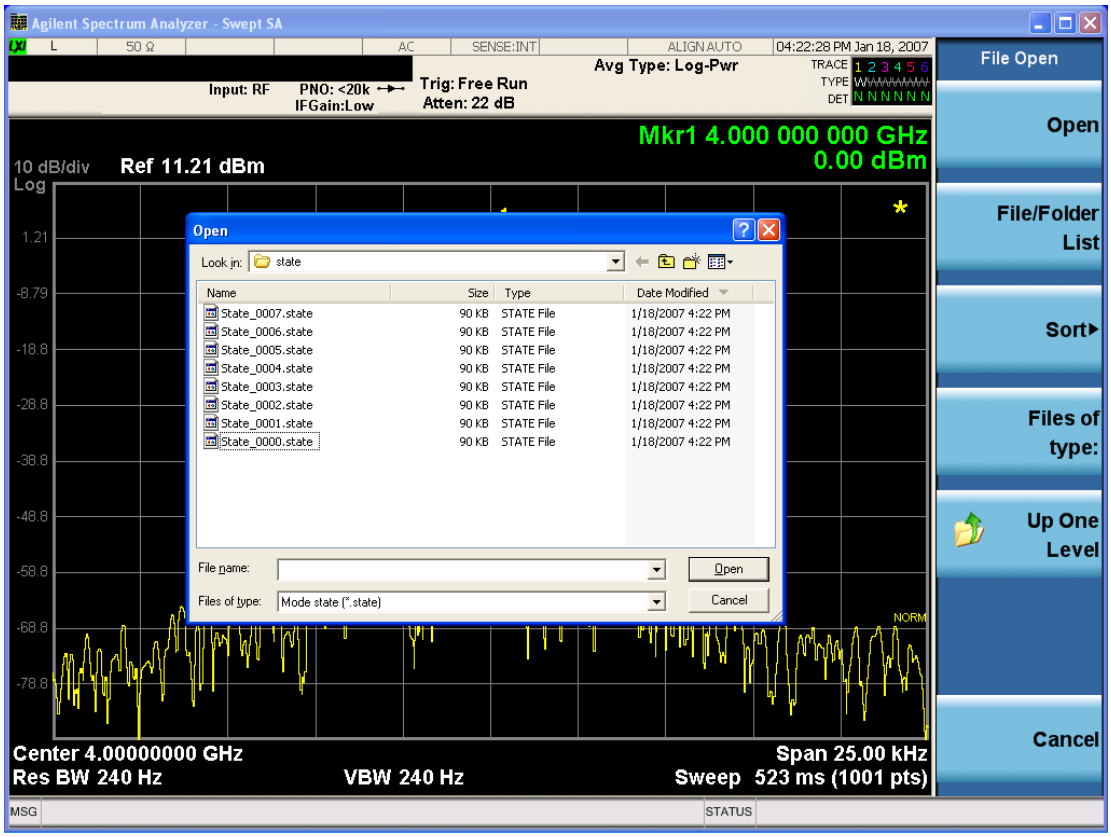
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

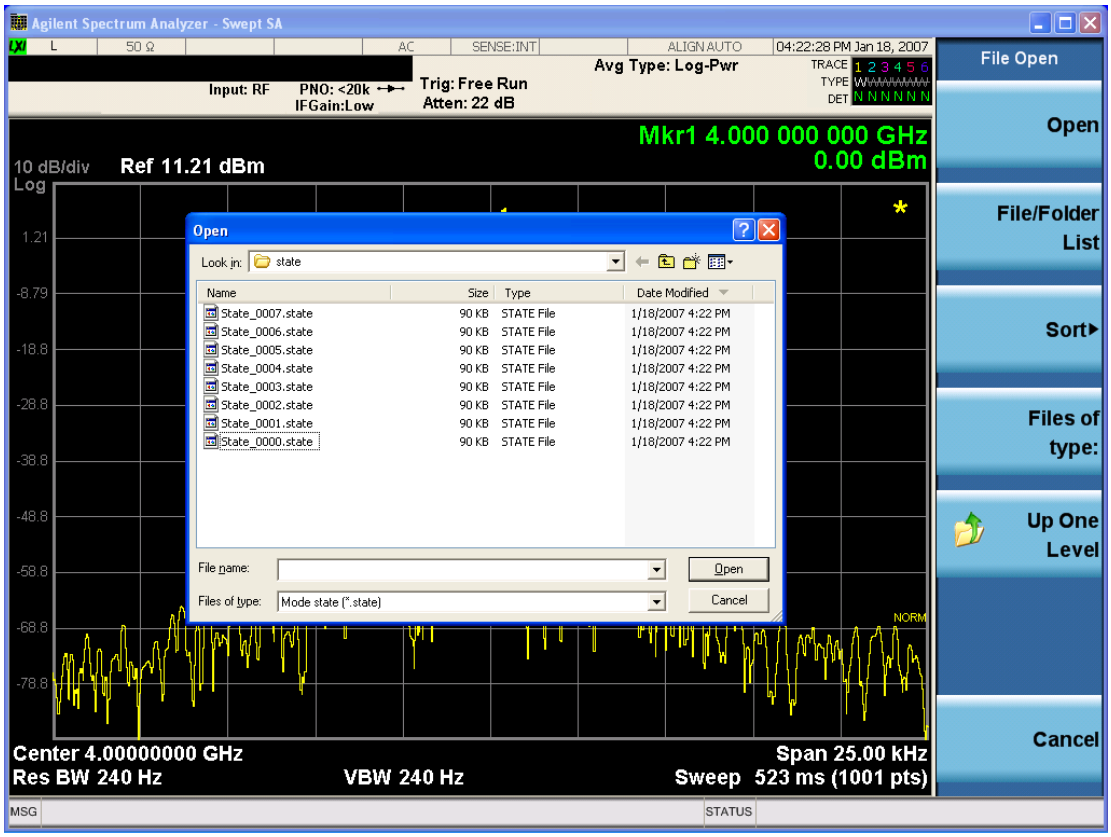
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 730

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

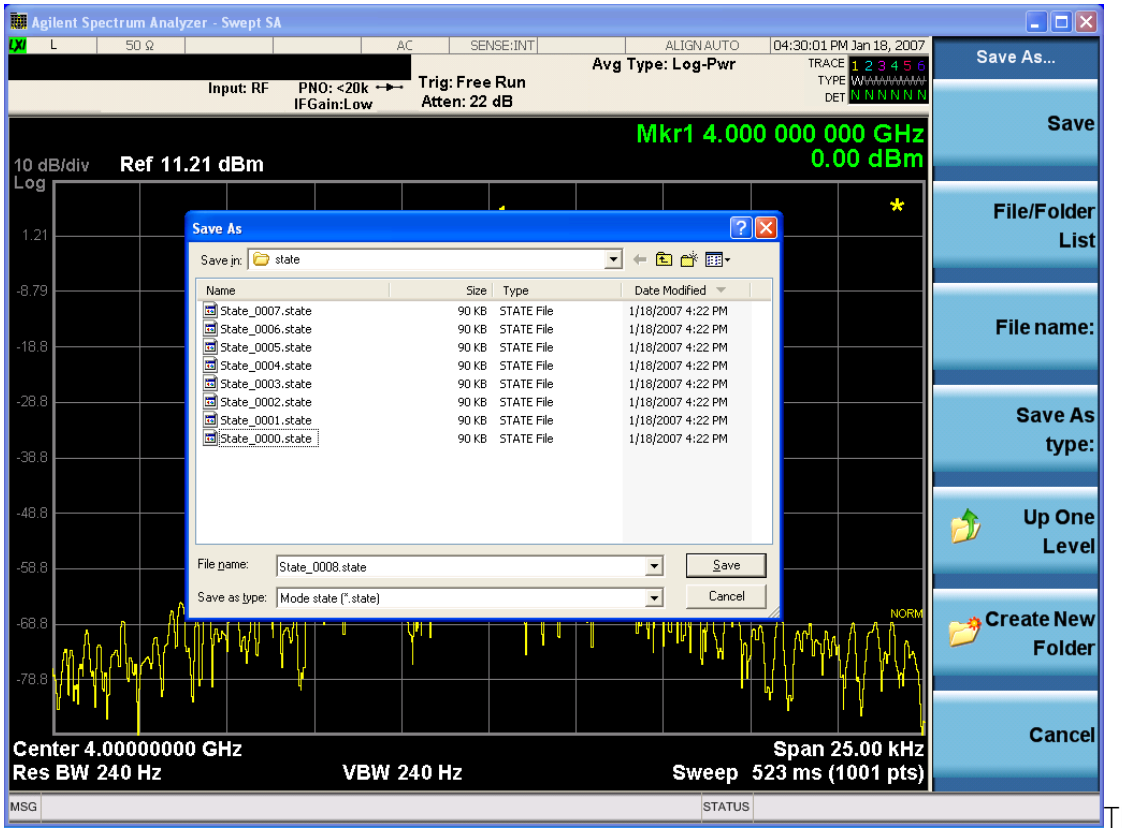
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 735

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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.

NOTE In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

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	The string must be a valid logical path.
	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.
	At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.
	Query returns full path of the default directory.
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	The string must be a valid logical path.
	Copies 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.

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	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.
	Valid device keywords are:
	SNS (smart noise source)
	An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information which describes the current state of the analyzer. It is detailed in Meas Result File Contents below.

Key Path	Save, Data
Remote Command	`:MMEMory:STORe:RESults <string>`
Example	:MMEM:STOR:RES “MeasR_0000.csv”
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports ACP measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\ACP\results. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an

	instrument software upgrade. The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the ACP measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is “MeasResult”
- Measurement ID following Mode ID, which is “SA:ACP” for example.
- Firmware rev and model number
- Option string
- Auto Scaling
- Auto Sweep Time Rules
- Automatic Trigger Time
- Automatic Trigger Time State
- Average Mode
- Average Number
- Average State
- Bar Graph
- Carrier Coupling
- Carrier Pwr Present
- Carrier Spacing
- Carriers
- Center Frequency
- Center Frequency Step
- Center Frequency Step State
- Detector Auto
- Detector Selection
- Electrical Atten

- Electrical Atten State
- External Array Trigger Delay
- External Array Trigger Delay State
- External Array Trigger Level
- External Array Trigger Slope
- Filter Alpha
- Filter BW
- Filter Type
- Internal Preamp
- Internal Preamp Band
- Limit Test
- Line Trigger Delay
- Line Trigger Delay State
- Line Trigger Slope
- Meas Method
- Meas Type
- Measurement Noise Bandwidth
- Mechanical Atten
- MechanicalAttenStepEnum
- Method
- Noise Correction
- Offset Abs Limit
- Offset Fail
- Offset Filter Alpha
- Offset Filter BW
- Offset Filter Type
- Offset Freq
- Offset Freq State
- Offset Integ BW
- Offset Method
- Offset Rel Lim (Car)

- Offset Rel Lim (PSD)
- Offset Res BW
- Offset Res BW Mode
- Offset Video BW
- Offset Video BW Mode
- Periodic Timer Period
- Periodic Timer Sync Source
- Periodic Timer Trigger Delay
- Periodic Timer Trigger Delay State
- Points
- Power Ref
- Power Ref State
- Preselector Adjust
- PSD Ref
- PSD Unit
- Ref Car Freq
- Ref Car Freq State
- Ref Carrier
- Ref Carrier Mode
- Ref Position
- Ref Value
- Res BW
- Res BW Mode
- RFBurst Trigger Delay
- RFBurst Trigger Delay State
- RFBurst Trigger Level Abs
- RFBurst Trigger Level Rel
- RFBurst Trigger Level Type
- RFBurst Trigger Slope
- Scale/Div
- Span

- Sweep Time
- Sweep Time Auto
- Trigger Holdoff
- Trigger Holdoff State
- Trigger Source
- Video BW
- Video BW Auto

The file contains these data followed by MeasResult1, MeasResult2, and MeasResult3 that flag the start of the measurement results. Each line of Measurement Results consists of three comma separated values, MeasResult1 value, MeasResult2 value, and MeasResult3 value. MeasResult1 contains the same result as MEAS/READ/FETCh:ACPower1; MeasResult2, MEAS/READ/FETCh:ACPower2; MeasResult3, MEAS/READ/FETCh:ACPower3.

Exported file is .csv file. The Meas Results file, when imported into Excel, will show the following data:

MeasResult	
SA:ACP	
A.10.53	N9030A
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1
Auto Scaling	TRUE
Auto Sweep Time Rules	Accy
Automatic Trigger Time	0.1
Automatic Trigger Time State	FALSE
Average Mode	Exponential
Average Number	10

Average State	TRUE											
Bar Graph	TRUE											
Carrier Coupling	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Carrier Pwr Present	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Carrier Spacing	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
Carriers	1											
Center Frequency	1.33E+10											
Center Frequency Step	800000											
Center Frequency Step State	TRUE											
Detector Auto	TRUE											
Detector Selection	Average											
Electrical Atten	0											
Electrical Atten State	FALSE											
External Array Trigger Delay	1.00E–06	1.00E–06										
External Array Trigger Delay State	FALSE	FALSE										
External Array Trigger Level	1.2	1.2										
External Array Trigger Slope	Positive	Positive										
Filter Alpha	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Filter BW	Minus3dB											
Filter Type	Gaussian											
Internal Preamp	FALSE											
Internal Preamp Band	Low											

Limit Test	FALSE											
Line Trigger Delay	1.00E-06											
Line Trigger Delay State	FALSE											
Line Trigger Slope	Positive											
Meas Method	IbwSpeed											
Meas Type	TPRef											
Measurement Noise Bandwidth	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Mechanical Atten	10											
MechanicalAttenStepEnum	S2dB											
Method	IBW	IBW	IBW	IBW	IBW	IBW	IBW	IBW	IBW	IBW	IBW	IBW
Noise Correction	FALSE											
Offset Abs Limit	0	0	0	0	0	0						
Offset Fail	Relative	Relative	Relative	Relative	Relative	Relative						
Offset Filter Alpha	0.22											
Offset Filter BW	Minus3dB	Minus3dB	Minus3dB	Minus3dB	Minus3dB	Minus3dB						
Offset Filter Type	Gaussian	Gaussian	Gaussian	Gaussian	Gaussian	Gaussian						
Offset Freq	3000000	0	0	0	0	0						
Offset Freq State	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE						
Offset Integ BW	2000000	2000000	2000000	2000000	2000000	2000000						
Offset Method	FALSE											
Offset Rel Lim (Car)	-45	-60	0	0	0	0						
Offset Rel Lim (PSD)	-28.87	-43.87	0	0	0	0						

Offset Res BW	220000	220000	220000	220000	220000	220000
Offset Res BW Mode	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Offset Video BW	22000	22000	22000	22000	22000	22000
Offset Video BW Mode	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Periodic Timer Period	0.02					
Periodic Timer Sync Source	None					
Periodic Timer Trigger Delay	1.00E–06					
Periodic Timer Trigger Delay State	FALSE					
Points	1001					
Power Ref	–76.81 dBm					
Power Ref State	On					
Preselector Adjust	0					
PSD Ref	–139.82 dBm/Hz					
PSD Unit	DbmHz					
Ref Car Freq	13.255000000 GHz					
Ref Car Freq State	On					
Ref Carrier	1					
Ref Carrier Mode	On					
Ref Position	Top					
Ref Value	–30					
Res BW	220000					
Res BW Mode	FALSE					
RFBurst Trigger Delay	1.00E–06					
RFBurst Trigger Delay	FALSE					

State		
RFBurst Trigger Level Abs	–20	
RFBurst Trigger Level Rel	–6	
RFBurst Trigger Level Type	Absolute	
RFBurst Trigger Slope	Positive	
Scale/Div	10	
Span	8000000	
Sweep Time	0.02	
Sweep Time Auto	TRUE	
Trigger Holdoff	0.1	
Trigger Holdoff State	FALSE	
Trigger Source	Free	
Video BW	22000	
Video BW Auto	TRUE	
MeasResult1	MeasResult 2	Meas Result 3
–76.8058517744559	0	1
0.084790019950006	–76.8058517744559	0
0.0283929128313787	–999	1
	–999	0
	–999	1

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

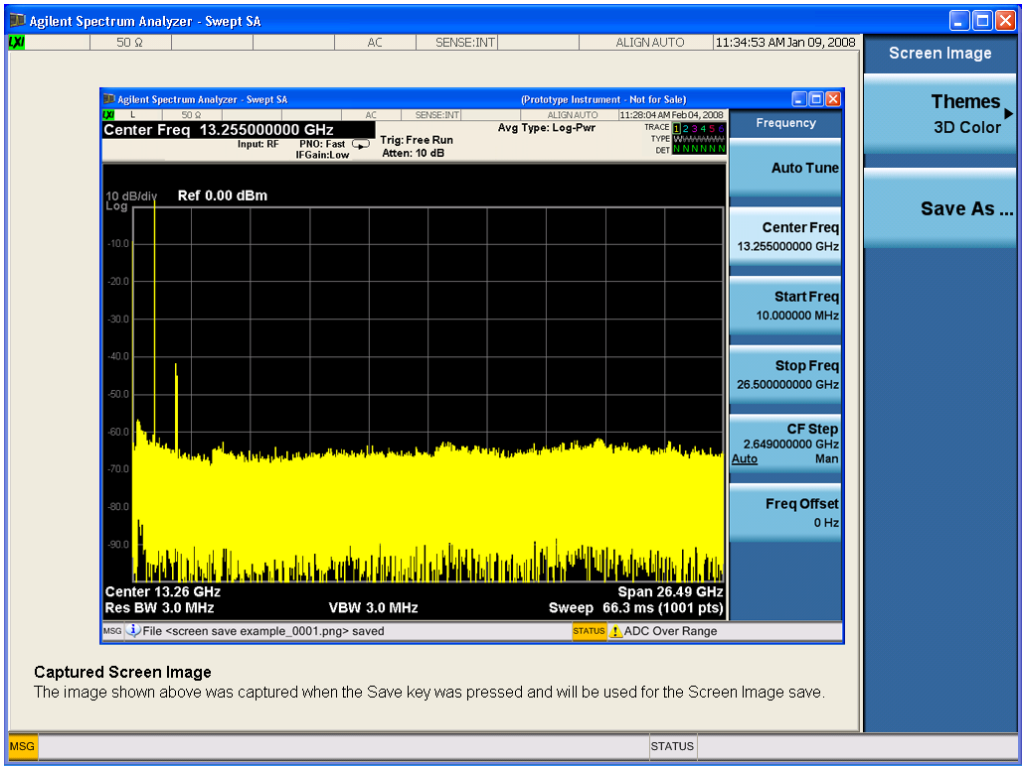
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 756

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 759 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	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. 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. 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. 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.
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 the "RF Power Range " on page 759 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 759 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 763, "W-CDMA Channel Number Ranges" on page 764, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 766, and "LTE FDD Channel Number Ranges" on page 768.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719	0.025×N+ 806.000
		720 ≤ N ≤ 919	0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719	0.025×N+ 851.000
		720 ≤ N ≤ 919	0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
	Uplink (MS, reverse link)	1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
	Downlink (BS, forward link)	1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
	Downlink (BS, forward link)		

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

$Nt = 5*F\ 0.0\ MHz \leq F \leq 3276.6\ MHz$

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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 “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 2009 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source

Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`

Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns :SOUR:RAD:ARB:TRIG:EXT:DEL? :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms OFF
Min	0 s
Max	8.589934588 s (Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN <freq>` `[:SENSe]:ACPower:FREQuency:SPAN?`
Example	ACP:FREQ:SPAN 25MHz ACP:FREQ:SPAN?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Couplings	The span value is clipped when the carrier settings and/or the offset settings are changed. The value is changed to satisfy following formula: Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)
Preset	SA: 8 MHz WCDMA: 24.6848 MHz WIMAX OFDMA: 50 MHz C2K: 4.5 MHz TD-SCDMA: 8 MHz 1xEVDO: 4.05 MHz DVB-T/H: 40 MHz DTMB (CTTB): 72 MHz ISDB-T: 30 MHz CMMB: 72 MHz LTE, LTETDD, MSR: 25 MHz Digital Cable TV: 40 MHz LTEAFDD,LTEATDD: 25MHz

State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: Option F03 = 3.0 GHz Option F07 = 7.5 GHz Option F13 = 13.6 GHz Option F26 = 26.5 GHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:FULL`
Example	ACP:FREQ:SPAN:FULL
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	For MSR and LTE-Advanced FDD/TDD mode, this key is blank.
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 will remain unchanged.

Key Path	SPAN X Scale
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:PREVious`
Example	ACP:FREQ:SPAN:PREV
Notes	You must be in the mode that includes ACP measurements 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.02.00, A.03.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep time, and source.

See Key and Command Descriptions – Sweep/Control for more information.

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

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. In swept spans, the sweep time varies from 1 millisecond to 2000 seconds. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the sweep time.

If you increase the sweep time, you increase the length of the time data captured and the number of points measured. You might need to specify a specific sweep speed to accommodate a specific condition in your transmitter. For example, you may have a burst signal and need to measure an exact portion of the burst.

Selecting a specific sweep time may result in a long measurement time since the resulting number of data points my not be the optimum 2n. Use [:SENSe]:ACP:OFFSet:LIST:SWEep:TIME to set the number of points used for measuring the offset channels for Basic and cdmaOne.

For cdma2000 and W-CDMA, this command sets the sweep time when using the sweep mode. See [:SENSe]:ACP:SWEep:TYPE

Key Path	Sweep/Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD

Remote Command	`[:SENSe]:ACPower:SWEep:TIME <time>`
	`[:SENSe]:ACPower:SWEep:TIME?`
	`[:SENSe]:ACPower:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:ACPower:SWEep:TIME:AUTO?`

Example	ACP:SWE:TIME 50ms ACP:SWE:TIME? ACP:SWE:TIME:AUTO OFF ACP:SWE:TIME:AUTO?
Notes	This parameter is preset by Meas Method selection. Preset values are as follows:

	IBW: 29 ms IBWR: 108 ms FAST (WCDMA): 7.5 ms
Preset	SA, LTE, LTETDD, MSR: Automatically calculated WCDMA: 29 ms WIMAX OFDMA: Automatically calculated C2K: Automatically calculated TD-SCDMA: Automatically calculated 1xEVDO: Automatically calculated DVB-T/H: Automatically calculated DTMB (CTTB): Automatically calculated ISDB-T: Automatically calculated CMMB: Automatically calculated Digital Cable TV: Automatically calculated LTEAFDD, LTEATDD: Automatically calculated SA, LTE, LTETDD, MSR, LTEAFDD, LTEATDD: ON WCDMA: OFF C2K: OFF (mehtod IBW) WIMAX OFDMA: ON TD-SCDMA: ON DVB-T/H: ON DTMB (CTTB): ON ISDB-T: ON CMMB: ON Digital Cable TV: ON
State Saved	Saved in instrument state.
Min	1 ms
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 the sweep setup menu.

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.

Key Path	Sweep/Control, Sweep Setup
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes?`
Example	ACP:SWE:TIME:AUTO:RUL NORM ACP:SWE:TIME:AUTO:RUL?
Notes	Set to Norm when Auto Couple is pressed or sent remotely.
Preset	SA, WCDMA, C2K, TD-SCDMA, 1xEVDO, DTMB (CTTB), LTE, LTETDD, MSR, LTEAFDD, LTEATDD: ACCuracy WIMAX OFDMA, DVB-T/H: NORMal ISDB-T, CMMB: NORMal Digital Cable TV: 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 where it was paused. When Paused, pressing Restart, Single, or Cont does a Resume

See Pause/Resume 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

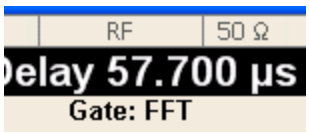
Readback	The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT.
Initial S/W Revision	Prior to A.02.00

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: • 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

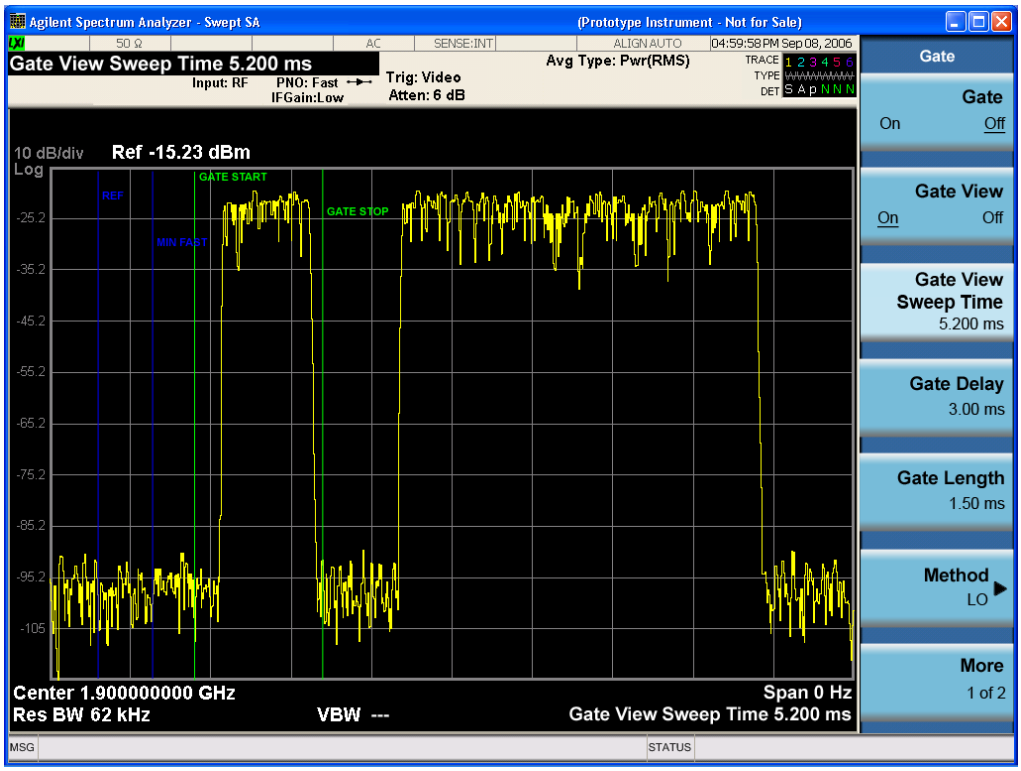
Gate View On/Off

Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

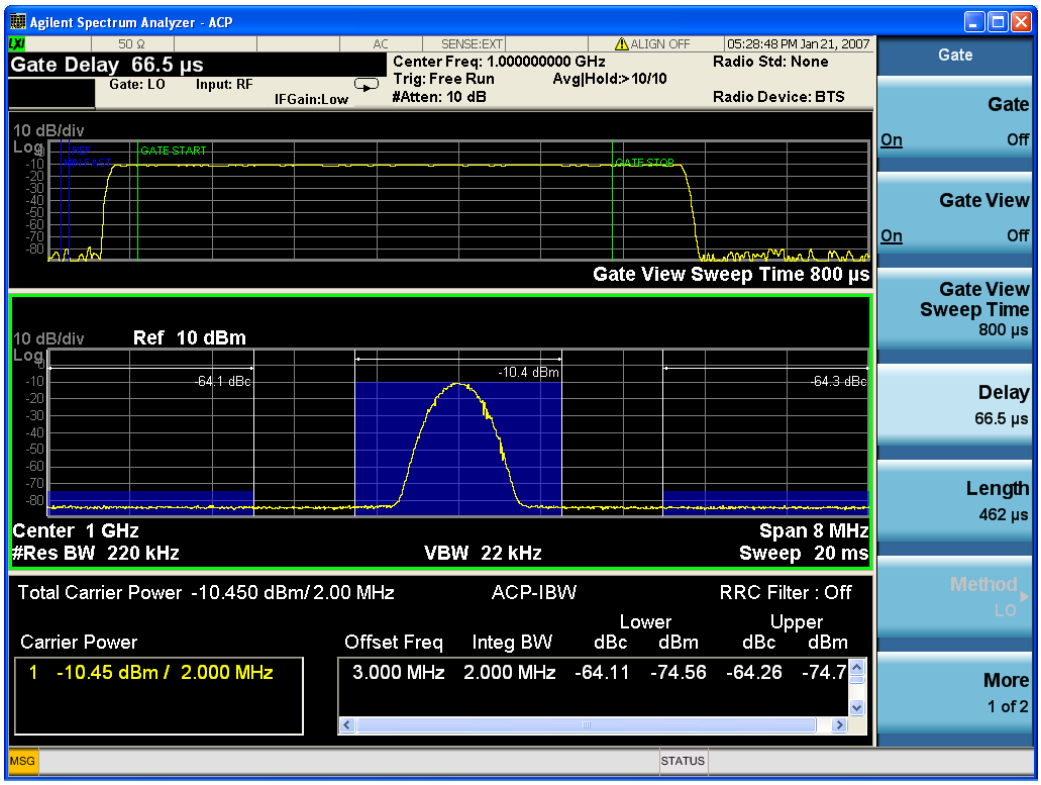
Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window, showing the positions of the Gate, 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: • 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 1468 • 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: • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. 1. Compute the location of the "gate stop" line, which you know is at time t = tmin + GateDelay +

	GateLength.
Preset	519.3 µs 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	–3.5V
Max	3.5V
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	–3.5V
Max	3.5V
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.

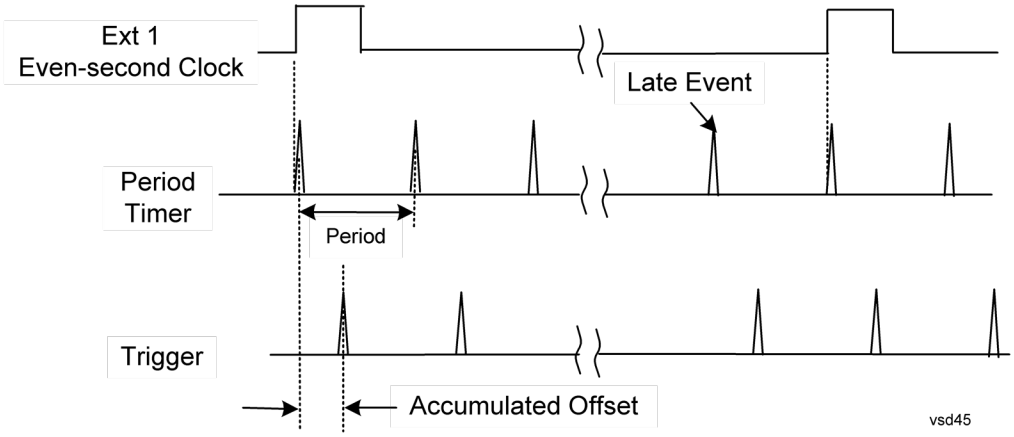
A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source

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	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 321.

	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 321 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	–3.5V
Max	3.5V
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	–3.5V
Max	

	3.5V
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: • 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 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	`[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel <voltage>` `[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel?`
Notes	This command is simply an alias to :TRIGger[:SEQuence]:EXTernal[1]|2:LEVel 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	`[:SENSe]:SWEep:EGATe:POLarity NEGative|POSitive` `[:SENSe]:SWEep:EGATe:POLarity?`
Example	SWE:EGAT:POL NEG SWE:EGAT:POL?
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:POLarity 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, from 1 to 20001. The sweep time resolution setting will depend on the number of points selected.

Key Path	Sweep/Control
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:SWEep:POINts <integer>` `[:SENSe]:ACPower:SWEep:POINts?`
Example	ACP:SWE:POIN 500 ACP:SWE:POIN?
Notes	Whenever the number of sweep points changes: • All trace data is erased • Any traces with Update Off will 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 will be updated • If averaging/hold is on, averaging/hold starts over
Couplings	Whenever the number of sweep points changes, the sweep time is re-quantized.
Preset	Others: 1001 DVB-T/H:2001 DTMB (CTTB): 2001 ISDB-T: 2001 CMMB: 2001 Digital Cable TV: 2001
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.02.00, A.03.00

System

See "System" on page 230

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

Select Trace (Front-panel Only)

This key selects which trace the other parameters under the Trace/Detector menu will apply to.

Key Path	Trace/Detector
Notes	Front-panel only.
Couplings	When Meas Method is RBW or FAST, Select Trace is disabled.
Preset	1
State Saved	Saved in instrument state.
Range	1 | 2 | 3
Initial S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace for the current measurement. The first page of this menu contains a selection of the trace type (Clear Write, Trace Average, Max Hold, Min Hold) for the selected trace.

Key Path	Trace/Detector
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:TRACe[1]|2|3:ACPower:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe[1]|2|3:ACPower:TYPE?`
Example	TRAC:ACP:TYPE MINH TRAC:ACP:TYPE?
Notes	WRITe = Clear Write AVERage = Average MAXHold = Maximum Hold MINHold = Minimum Hold
Couplings	When Detector setting is “Auto” ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section below) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be ‘on’ for them to operate.

	When Meas Method is RBW or FAST, Trace Type is disabled.
Preset	AVERage
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

View/Blank

Enables you to select how to view the displayed trace.

Key Path	Trace/Detector
Mode	SA,WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Notes	No remote control. Front panel only.
Couplings	The four states of this 1-of-N actually set two variables, Update and Display, to their four possible combinations. Trace On: Update and Display both On View: Update Off and Display On (Not implemented) Blank: Update Off and Display Off Background: Update On, Display Off (Not implemented) See tables below for detail on remote commands to control these two variables. Selecting a trace type (Clear Write, Trace Average, Max Hold, Min Hold) for a trace (pressing the key or sending the equivalent remote command) puts the trace in 'Trace On' state (Update On and Display On), even if that trace type was already selected. When Meas Method is RBW or FAST, this key is grayed out.
Preset	Trace On
State Saved	Saved in instrument state.
Range	Trace On|Blank
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Key Path	Trace/Detector
Mode	WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:TRACe[1]|2|3:ACPower:UPDate[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3:ACPower:UPDate[:STATe]?`
Example	TRAC:ACP:UPD ON TRAC:ACP:UPD?
Couplings	Whenever you set Update to On for any trace, the Display is set to On for that trace. When Meas Method is RBW or FAST, Trace Update is disabled.
Preset	1|0|0 (On for Trace 1; Off for 2 &3)

State Saved	Saved in instrument state.
Range	0 1
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

Key Path	Trace/Detector
Mode	WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:TRACe[1]|2|3:ACPower:DISPlay[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3:ACPower:DISPlay[:STATe]?`
Example	TRAC:ACP:DISP ON TRAC:ACP:DISP?
Couplings	Whenever you set Update to On for any trace, the Display is set to On for that trace. When Meas Method is RBW or FAST, Trace Display is disabled.
Preset	1|0|0 (On for Trace 1; Off for 2 &3)
State Saved	Saved in instrument state.
Range	0 1
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. Allows up to three (3) traces, but each use the same detector type choiceThe following choices are available:

- Auto– the detector selected is set to AVERage, unless the Radio Standard defaults state otherwise e.g. it is set to Peak for Radio Standard = PDC when Device = both MS and BTS, and when Radio Standard = NADC and Device = MS.
- 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 is Power (RMS).
- 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.

In swept analysis, the time interval of the data collection for the display sweep points also represents a frequency interval. In FFT analysis, the sweep points represents just a frequency interval. The detector

determines the relationship between the spectrum computed by the FFT and the single data point displayed for the sweep points.

Key Path	Trace/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, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:DETector:AUTO ON|OFF|1|0` `[:SENSe]:ACPower:DETector:AUTO?`
Example	ACP:DET:AUTO 1 ACP:DET?
Couplings	When Detector setting is “Auto” ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be ‘on’ for them to operate.
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

Detector Selection

Selects a detector to be used by the analyzer for the current measurement. All traces will use the same detector type, similar to Monitor Spectrum measurement

Key Path	Trace/Detector
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`[:SENSe]:ACPower:DETector[:FUNCtion] AVERage | NEGative | NORMal | POSitive | SAMPle` `[:SENSe]:ACPower:DETector[:FUNCtion]?`
Example	ACP:DET NORM ACP:DET?
Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of

	other analyzer settings. The detector choices are: • 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. • The Average detector determines the average of the signal within the data range. The averaging method is Power (RMS). • The Peak detector determines the maximum of the signal within the data range. • The Sample detector indicates the instantaneous level of the signal at the center of the data represented by each display point. • The Negative Peak detector determines the minimum of the signal within the data range. Because they may not find a spectral component's true peak, neither average nor sample detectors measure amplitudes of CW signals as accurately as peak or normal, but they do measure noise without the biases of peak detection. When a detector selection is made, the menu returns to the previous menu.
Couplings	When Detector setting is “Auto” ([:SENSe]:ACPower:DETector:AUTO?), Detector is set to what the Radio Standard defaults states (see detector section) for all conditions of Trace Type and for all traces. When set to Manual, all Traces use the same detector type. When Average State = Off then Trace Types AVERage, MaxHold and MinHold will not function, since Averaging is required to be ‘on’ for them to operate. Only one detector type for all 3 traces is allowed. When Meas Method is RBW or FAST, Detector is disabled.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Backwards Compatibility SCPI	`[:SENSe]:ACPR:SWEep:DETector[:FUNCtion]`
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 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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.

If current mode is NOT MSR and LTE-Advanced FDD/TDD mode, the front panel views only contain one view: Spectrum View.

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.

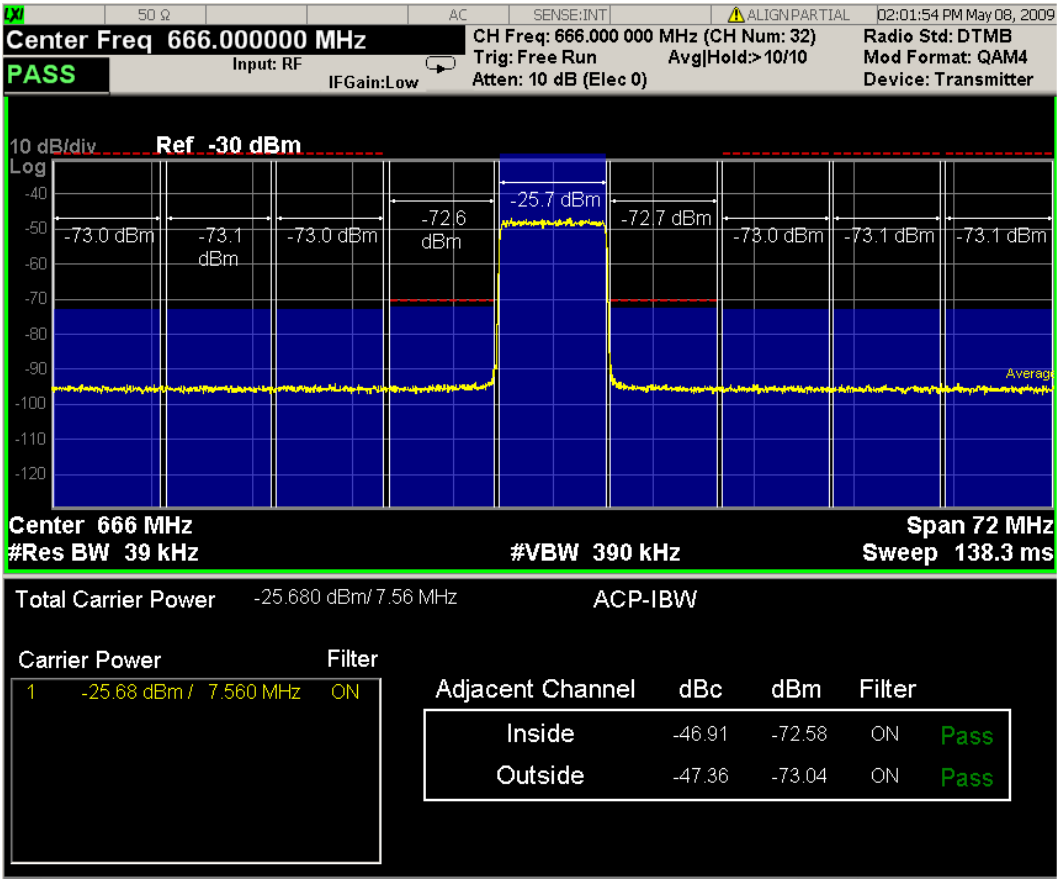
The display consists of the following two windows:

"Spectrum Window" on page 911

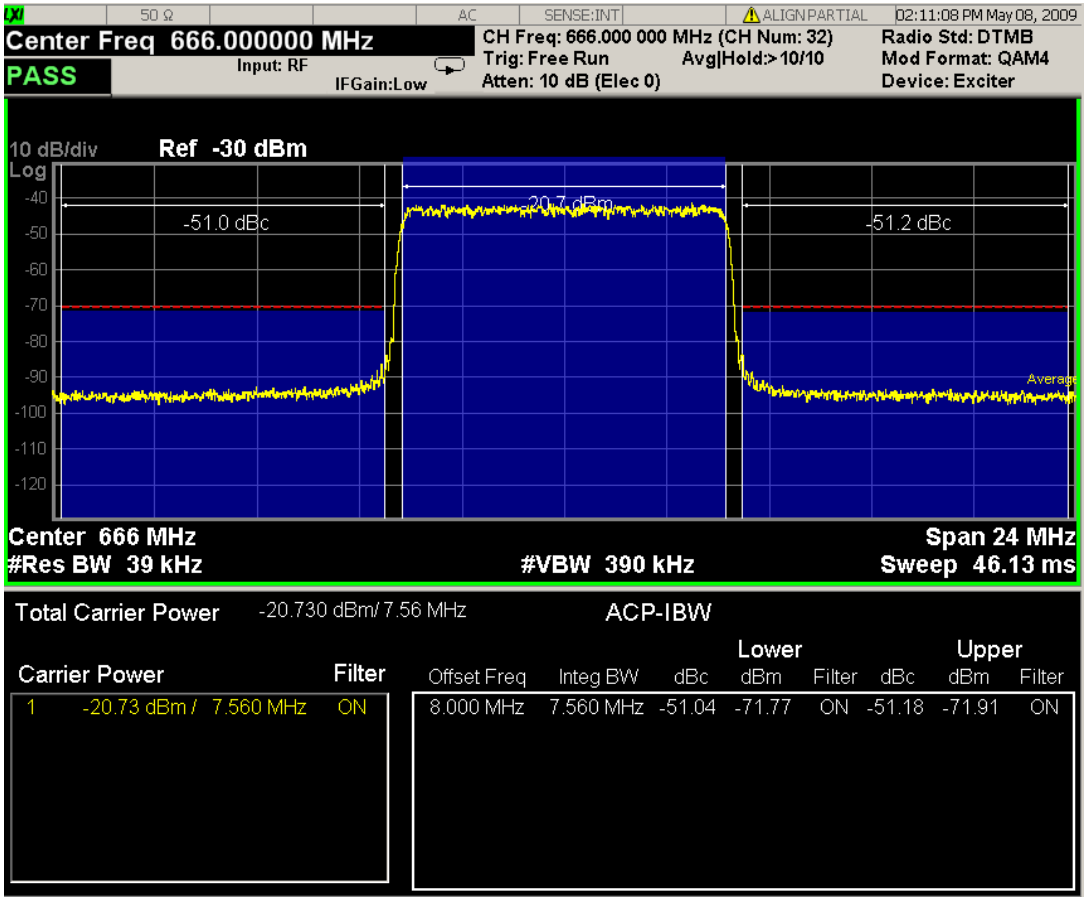
"Results Window" on page 911

The following two views are only for DTMB (CTTB) and CMMB:

DTMB and CMMB Transmitter:



DTMB and CMMB Exciter:



Spectrum Window

When the Bar Graph is On and Limit Test is On, the color of each bar graph reflects the limit test result. When the limit test fails, the bar color is red, and when limit test passes, the bar color is blue.

When RBW is selected as the measurement method, the spectrum trace is not displayed, only the bar graph is displayed. In addition, the Bar Graph key (under the View/Display front-panel key) is set to ON and is grayed out.

The RRC Filter display item is only displayed when RRC filter is on.

Results Window

The text window displays the following results:

Total Carrier Power

This is the total power of all the carriers with carrier power present set to yes. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for each carrier and then totaling the sums. The total integration bandwidth is shown as part of the result. This will be the total of the Carrier Integ Bw of the carriers used in calculating the total carrier power. If the RRC Filter is on, then the integration bandwidth used is (1 + alpha)/T where T = 1/(Carrier Integ Bw) multiplied by the number of carriers with carrier power present set to yes.

Ref Carrier Power

This is the power in the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for that carrier. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for that carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

Carrier Power
This is the power in all the currently defined carriers. If the carrier has carrier power present, the power will be absolute. If the carrier is defined as not having power present, the power will be relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for the carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

As there are potentially more results than can be easily viewed on the display, a scrollable list is used to display all results. The Carrier Results menu key is used to index the carrier amplitude results. This key isle grayed out unless the measurement is in single mode (as in continual measurement mode). The display is continuously updating and will not need to be accessed. The currently selected Carrier Result is displayed on the last line of the carrier power result list unless:

- The selected Carrier Result is 4 or less in normal multi carrier power results view. In this case the first 4 carrier power results will be displayed.
- The selected Carrier Result is 9 or greater in normal multi carrier power results view. In this case the last 4 carrier power results will be displayed.
- The zoom mode is selected. In this case all carrier power ranges can be displayed.

Offset Relative Power
This is the power in the offsets relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

Offset Absolute Power
This is the absolute power in the offsets. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

Inside Adjacent Channel Power (DTMB (CTTB) and CMMB only)

This result is only valid for DTMB (CTTB) transmitterand CMMB transmitter. It contains two parts: Relative Power and Absolute Power. The power is calculated by integrating across the bandwidth (Integ Bw) at the frequency Offset A.

Inside Absolute Power = MAX (PLower Offset A, PUpper Offset A);

Inside Relative Power = Inside Absolute Power – Carrier Power;

Outside Adjacent Channel Absolute Power (DTMB (CTTB) and CMMB only)

This result is only valid for DTMB (CTTB) transmitter and CMMB transmitter. It contains two parts: Relative Power and Absolute Power. The power is the Root-Mean-Square of the power calculated by integrating across the bandwidth (Integ Bw) at frequency Offset B, C and D.

$$Outside\ Absolute\ Power = \sqrt{\frac{P^2_{Lower\ OffsetB} + P^2_{Upper\ OffsetB} + P^2_{Lower\ OffsetC} + P^2_{Upper\ OffsetC} + P^2_{Lower\ OffsetD} + P^2_{Upper\ OffsetD}}{6}}$$

Outside Relative Power = Outside Absolute Power – Carrier Power;

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.

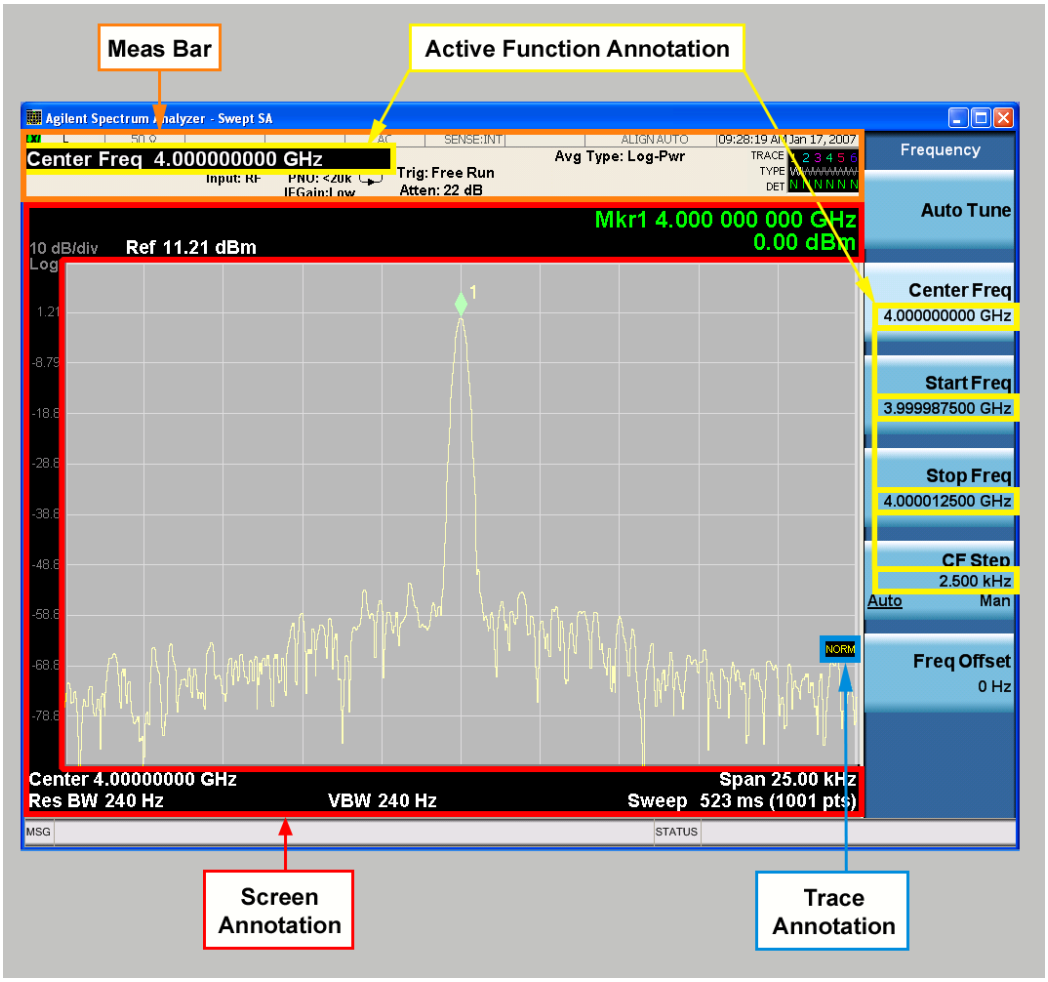
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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

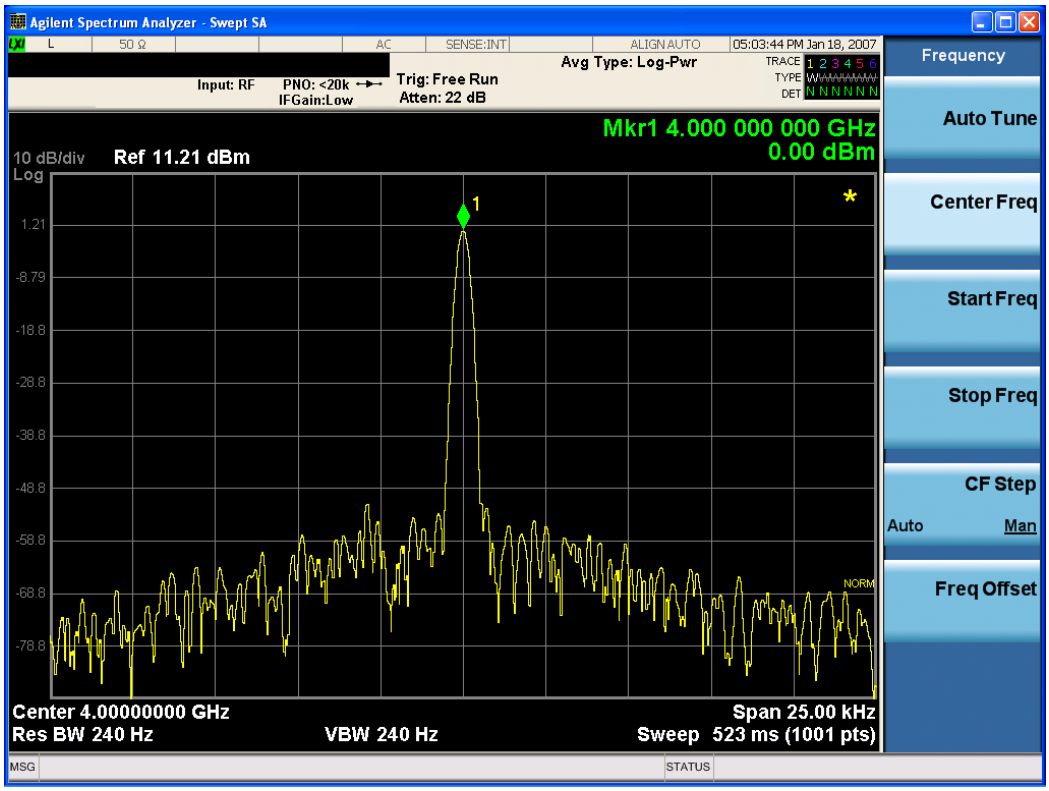
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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

Bar Graph

Turns the Bar Graph On and Off.

Key Path	View/Display
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB (CTTB), ISDB-T, CMMB, LTE, LTETDD, Digital Cable TV, MSR, LTEAFDD,LTEATDD
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph OFF|ON|0|1` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph?`
Example	DISP:ACP:VIEW:WIND:BGR OFF DISP:ACP:VIEW:WIND:BGR?
Notes	You must be in the mode that includes ACP measurements to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	When the method is RBW, this key is always set to On and grayed out.
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

10 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.

This topic contains the following sections:

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@29978.

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: 1. Occupied bandwidth – Hz 2. Total Power – dBm (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.
n = 3 (Mode = MSR, LTEAFDD, LTEATDD)	1. Number of active carriers Returns number of active carriers within Span in Auto detected mode, otherwise the command is out of scope

Key Path	Meas
Initial S/W Revision	Prior to A.02.00

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	`[: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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined` `[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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, LTETDD, 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/TDDor 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

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 keyactions 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 932

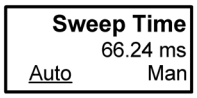
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

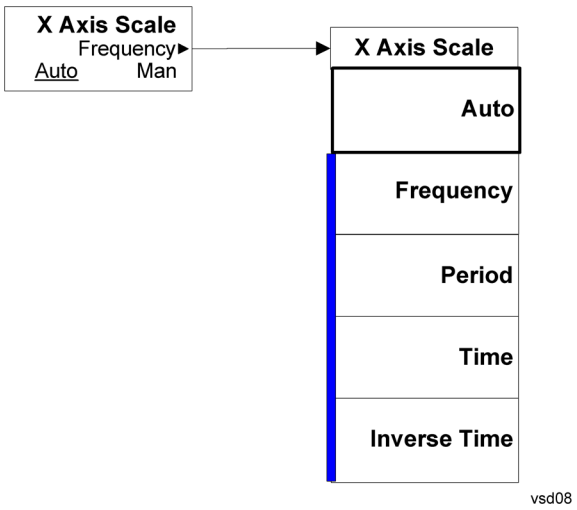
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
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.

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	`[:SENSe]:OBWidth:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo?`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:OBWidth:BANDwidth:VIDeo:AUTO?`

Example	OBW:BAND:VID 5 MHz OBW:BAND:VID? OBW:BAND:VID:AUTO ON OBW:BAND:VID: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.
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

	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

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.

Display

Accesses a menu of functions that enable you to set the display parameters.

See Display@3440 for more information.

Key Path	View/Display
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.

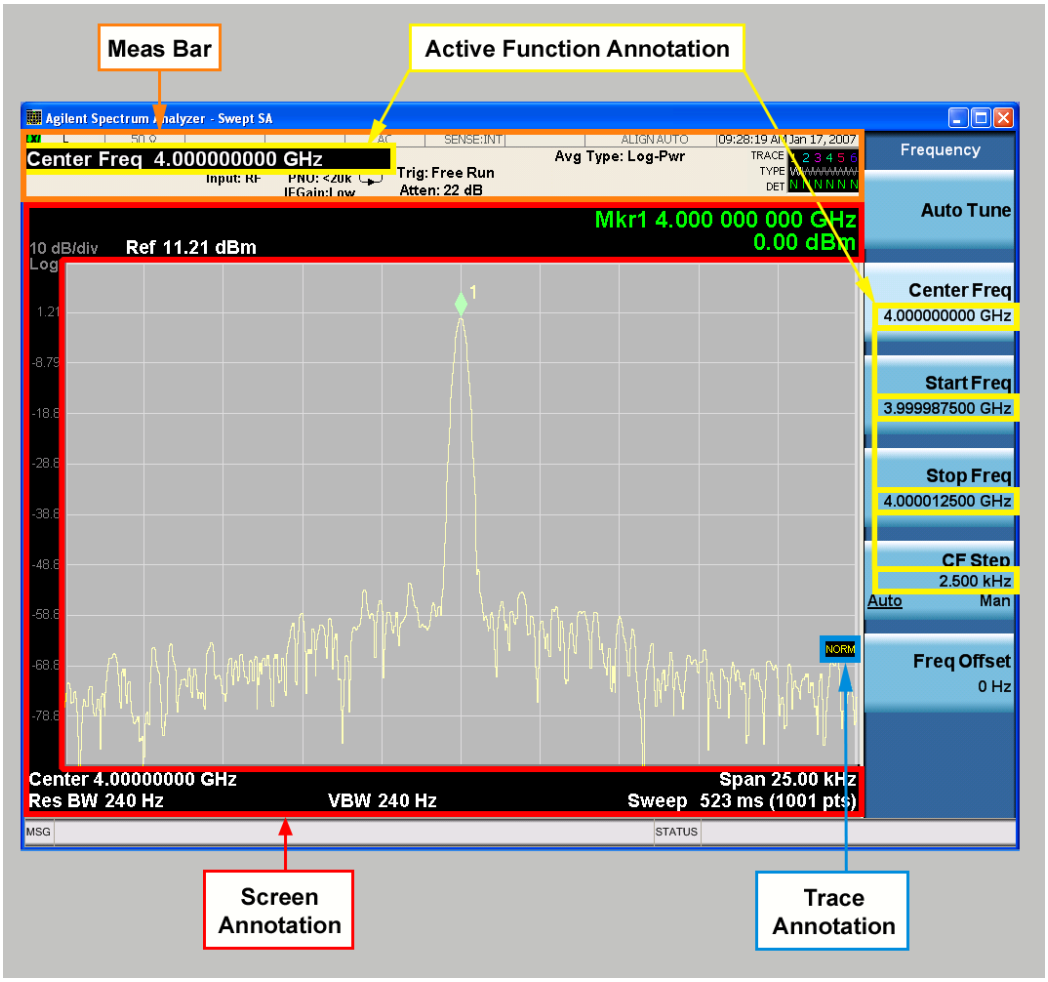
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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

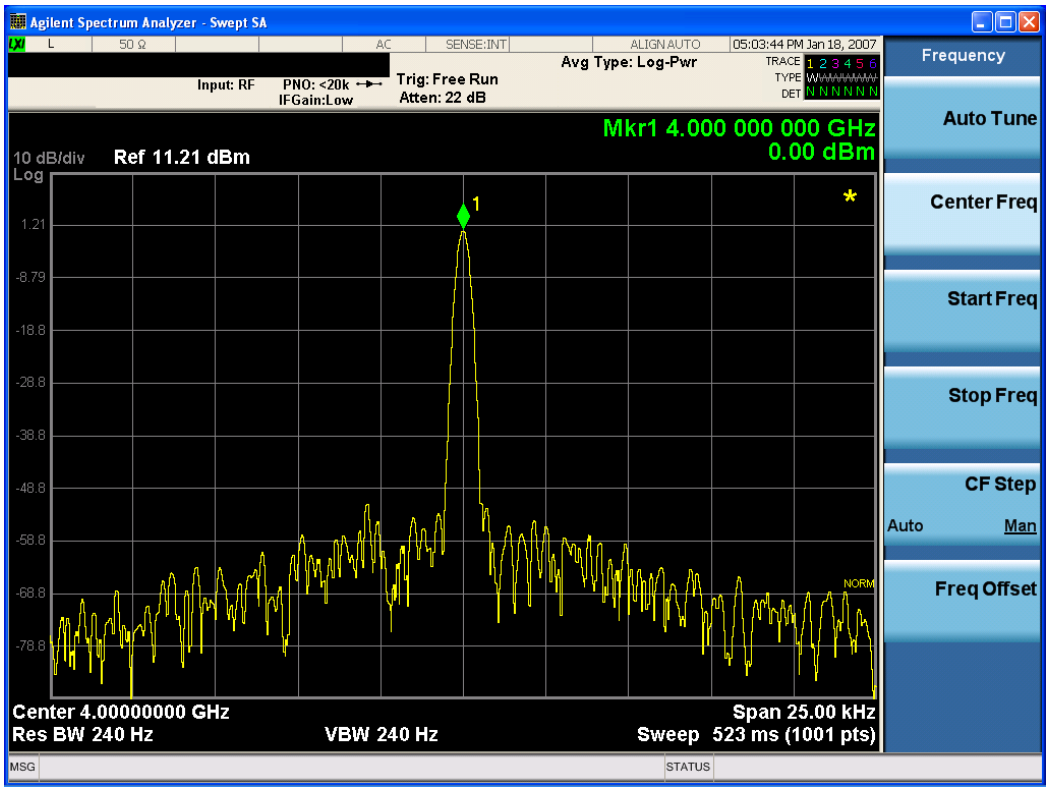
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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

Boundary Frequency

Selects frequency display type from either Offset or Absolute:

- OFFSet: offsets from Center Freq to OBW boundary frequency are displayed.
- ABSolute: absolute frequencies are displayed.

Key Path	View/Display, OBW Boundaries
Remote Command	`:DISPlay:OBWidth:VIEW2:WINDow2:BOUNdaries:FREQuency OFFSet | ABSolute` `:DISPlay:OBWidth:VIEW2:WINDow2:BOUNdaries:FREQuency?`
Example	DISP:OBW:VIEW2:WIND2:BOUN:FREQ ABS DISP:OBW:VIEW2:WIND2:BOUN:FREQ?
Preset	OFFSet
State Saved	Saved in instrument state
Range	Offset|Absolute
Initial S/W Revision	A.16.00

x dB BW Boundaries

Turns the x dB BW Boundaries On and Off.

Key Path	View/Display
Remote Command	`:DISPlay:OBWidth:VIEW:WINDow[1]:XDB 0|1|OFF|ON` `:DISPlay:OBWidth:VIEW:WINDow[1]:XDB?`
Example	DISP:OBW:VIEW:WIND:XDB 1 DISP:OBW:VIEW:WIND:XDB?
Preset	0
State Saved	Saved in instrument state
Range	On | Off
Initial S/W Revision	A.16.00

File

See "File" on page 224

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 953

See Ext Mix Center Freq

See "I/Q Center Freq" on page 955

See "Center Frequency Presets" on page 951

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 951 and "RF Center Freq" on page 953 and Ext Mix Center Freq and "I/Q Center Freq" on page 955.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 951 and "RF Center Freq" on page 953 and "I/Q Center Freq" on page 955.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 951 and "RF Center Freq" on page 953 and "I/Q Center Freq" on page 955.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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 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

Input/Output

See "Input/Output" on page 176

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.**

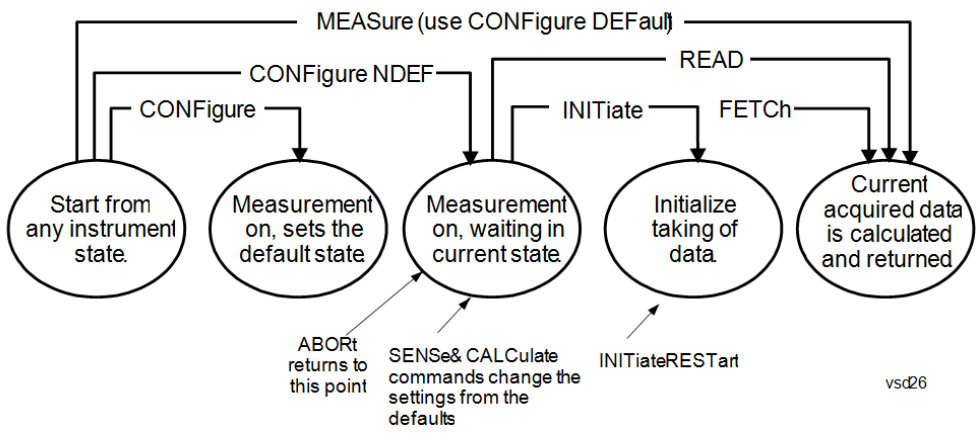
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} Xi$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} |Xi|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in \text{region(s)}} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi \; Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

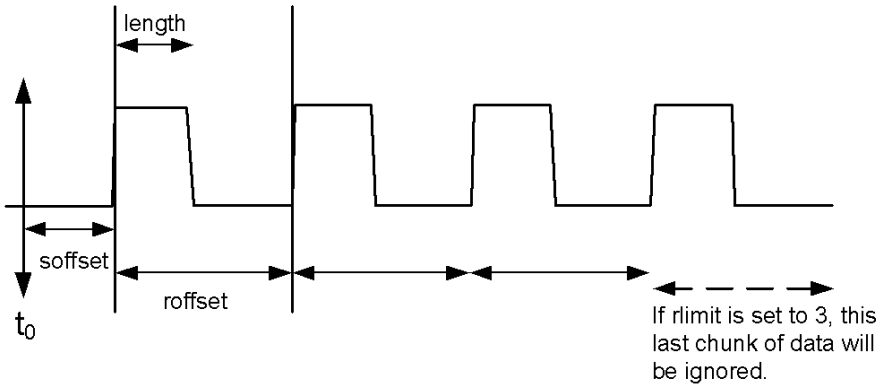
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

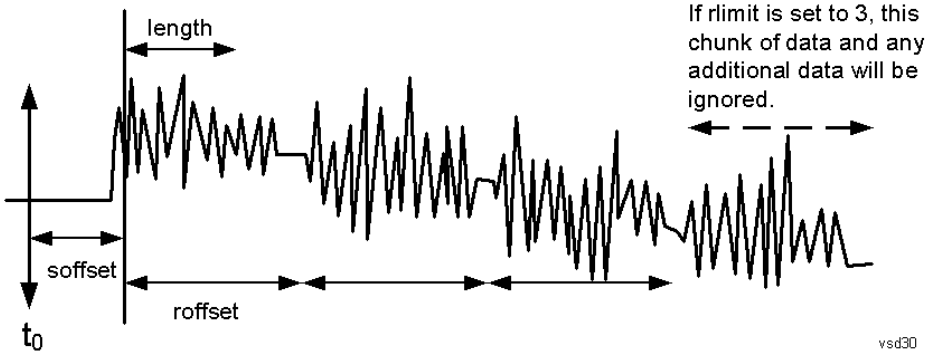
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

xample	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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	`[:SENSe]:EBWidth:AVERage:COUNt`
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	`[:SENSe]:OBWidth:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:OBWidth:AVERage:TCONtrol?`
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	`[:SENSe]:OBWidth:PERCent <real>`

	`[:SENSe]:OBWidth:PERCent?`
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/TDDor 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

Power Ref

This key enables you to select Power Ref Type.

- Total Power – Total power in the current span is displayed.
- OBW Power – With the OBW percent power, occupied power is displayed.

When Power Ref type is changed, the annotation in the lower window and Remote Command SCPI Results also change.

Key Path	Meas Setup
Remote Command	`[:SENSe]:OBWidth:PREFerence TPOWer|OBWPower` `[:SENSe]:OBWidth:PREFerence?`
Example	OBW:PREF TPOW OBW:PREF?
Preset	TPOWer
State Saved	Saved in instrument state
Range	TPOWer|OBWPower
Initial S/W Revision	A.16.00

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, LTETDD, BLUETOOTH, WLAN, MSR, LTEAFDD, LTEATDD
Remote Command	`[:SENSe]:OBWidth:XDB <rel_ampl>` `[:SENSe]:OBWidth:XDB?`
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	`[:SENSe]:EBWidth:XDB`
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 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 200

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 1000 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 219

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 229

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.

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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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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 1009.

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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

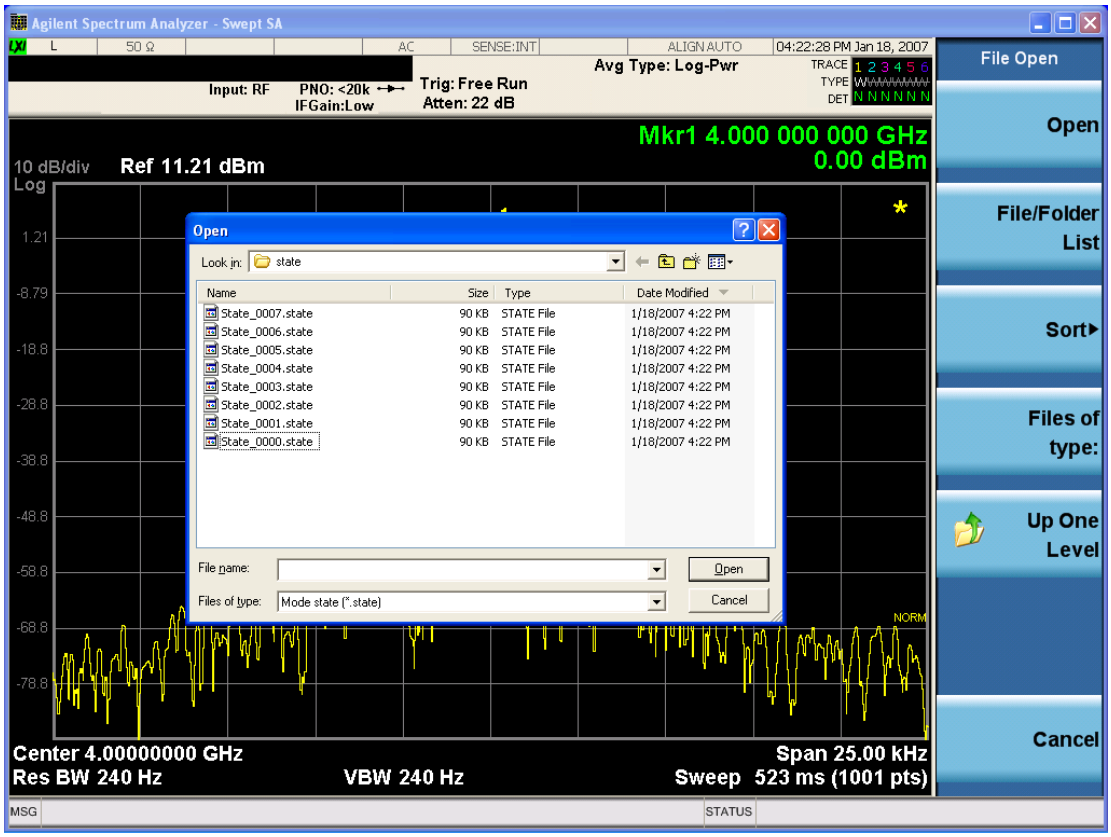
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

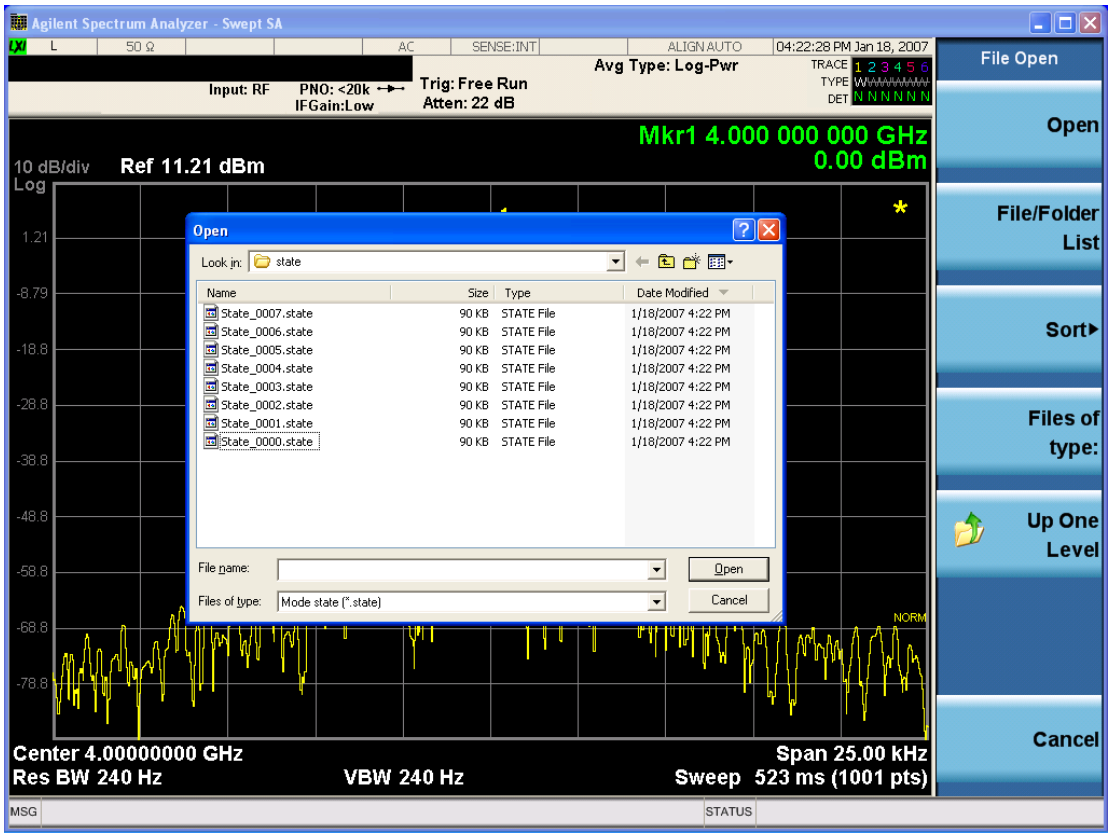
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 1020

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

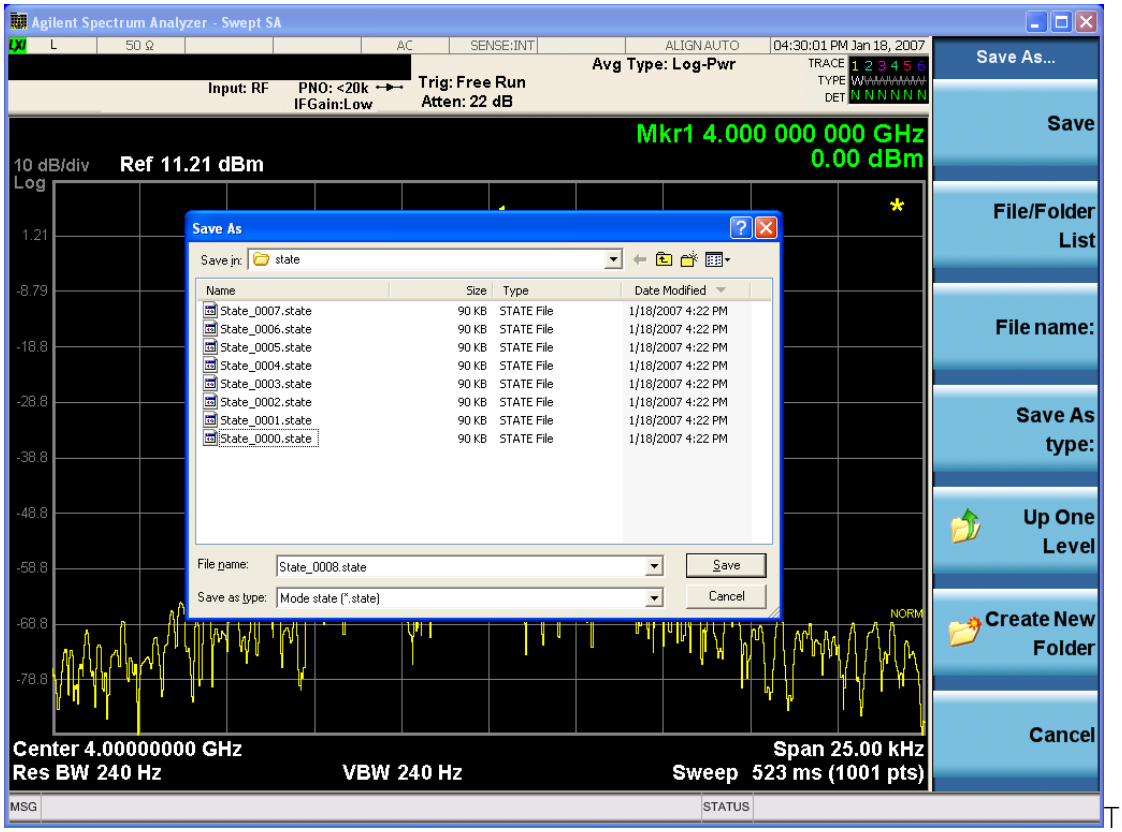
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 1025

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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.

NOTE In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

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	The string must be a valid logical path.
	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.
	At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.
	Query returns full path of the default directory.
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	The string must be a valid logical path.
	Copies 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.

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	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.
	Valid device keywords are:
	SNS (smart noise source)
	An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains measurement result sets, plus information describing the current state of the analyzer, as detailed in "Meas Results File Definition" on page 1034 and "Meas Results File Example" on page 1035 below.

Key Path	Save, Data
Remote Command	`:MMEMory:STORe:RESults <string>`
Example	:MMEM:STOR:RES “MeasR_0000.csv”
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports Occupied Bandwidth measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\OBW\results.

	Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Occupied Bandwidth measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

Meas Results File Definition

The content of a Meas Results File is defined in this section.

The first lines in the file consist of identification and instrument configuration details, as follows.

- File ID string, which is “MeasResult”
- Measurement ID following Mode ID, which is “SA:OBW” for example.
- Firmware rev and model number
- Option string
- Auto Sweep Time Rules
- Average Mode
- Average Number
- Average State
- Center Frequency
- Detector
- Electrical Atten
- Electrical Atten State
- IFGain
- IFGainAuto
- Internal Preamp
- Internal Preamp Band
- Limit
- Limit State
- Max Hold
- Mechanical Atten

- MechanicalAttenStepEnum
- OBW Percent Pwr
- Resolution Band Width
- Resolution Bandwidth Shape
- Span
- Sweep Points
- Sweep Time
- Sweep Time Auto
- TriggerSource
- Video Bandwidth
- x DB

The data above is followed in the file by a line containing “MeasResult1” and “MeasResult2”. This line forms a header for each set of measurement results, which appear in subsequent lines. Each line of Measurement Results consists of two comma-separated values, for MeasResult1 and MeasResult2 respectively.

The MeasResult1 set in the file corresponds to the data returned by MEAS|READ|FETCh:OBWidth1, and the MeasResult2 set corresponds to the data returned by MEAS|READ|FETCh:OBWidth2.

The exported file is in CSV format, with a .csv extension.

Meas Results File Example

When imported into Microsoft Excel, a typical Meas Results CSV file appears as shown in the example below.

MeasResult	
SA:OBW	
A.10.53	N9030A
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1
Auto Sweep Time Rules	Normal
Average Mode	Exponential
Average Number	10
Average State	TRUE
Center Frequency	1.33E+10
Detector	Average
IFGain	FALSE

IFGainAuto	FALSE
Internal Preamp	FALSE
Internal Preamp Band	Low
Limit	5000000
Limit State	FALSE
Max Hold	FALSE
OBW Percent Pwr	99
Resolution Band Width	27000
Resolution Bandwidth Shape	Gaussian
Span	3000000
Sweep Points	1001
Sweep Time	0.004933
Sweep Time Auto	TRUE
TriggerSource	Free
Video Bandwidth	270000
x DB	–26
MeasResult1	MeasResult2
2971020.10835045	–94.3702543927405
–74.9741251886604	–94.1447790390963

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

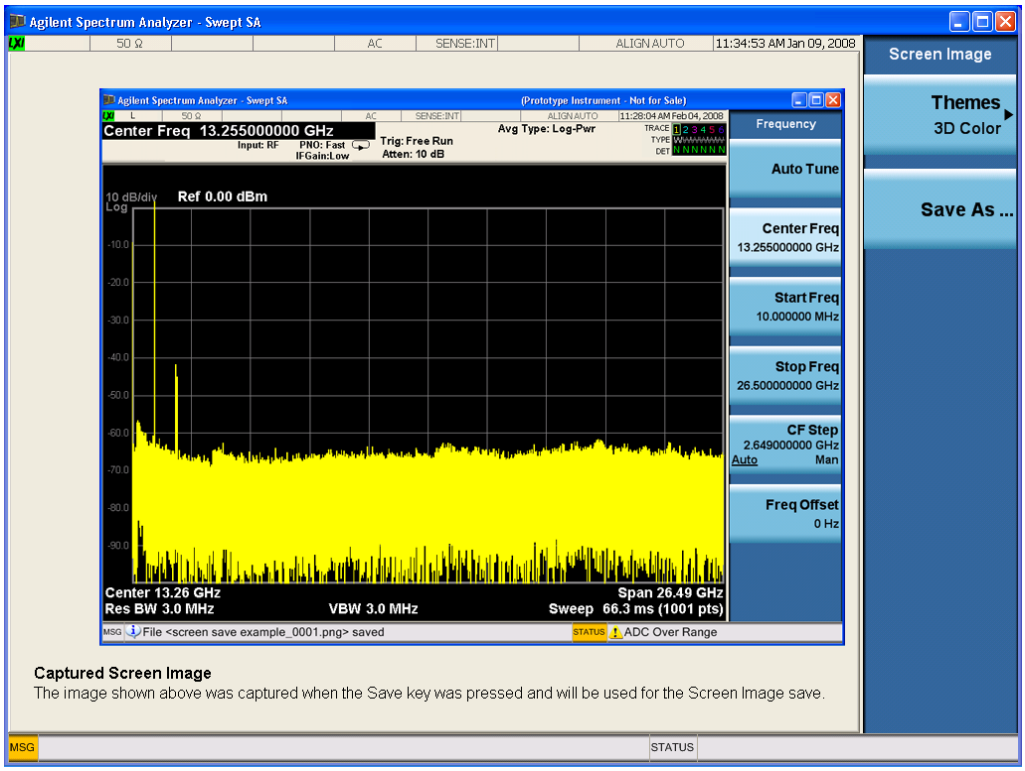
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 1041

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 1044 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	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. 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. 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. 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.
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 the "RF Power Range " on page 1044 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 1044 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 1048, "W-CDMA Channel Number Ranges" on page 1049, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1051, and "LTE FDD Channel Number Ranges" on page 1053.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 806.000 0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 851.000 0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link) Uplink (MS, reverse link) Uplink (MS, reverse link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 450.000 0.025×(N–472)+ 410.000 0.025×(N–1536)+ 479.000
	Downlink (BS, forward link) Downlink (BS, forward link) Downlink (BS, forward link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 460.000 0.025×(N–472)+ 420.000 0.025×(N–1536)+ 489.000

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

Nt = 5*F 0.0 MHz ≤ F≤ 3276.6 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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 “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 2009 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`
Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns
	:SOUR:RAD:ARB:TRIG:EXT:DEL?
	:SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON
	:SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms
	OFF
Min	0 s
Max	8.589934588 s
	(Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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 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 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, LTETDD, BLUETOOTH, WLAN, LTEAFDD, LTEATDD
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 compitible 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 sweep time and source for the current measurement.

For details about this key, see Sweep/Control.

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

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

- sweep rate = span/sweep time
- update rate = 1/(sweep time + overhead)
- sweep cycle time = sweep time + overhead

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points, so changing those parameters may change the sweep time.

This function is not available when the selected input is I/Q.

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.

Min	1 ms
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 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.

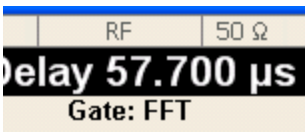
Key Path	Sweep/Control
Scope	Meas Global
Readback	The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT.
Initial S/W Revision	Prior to A.02.00

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: • 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

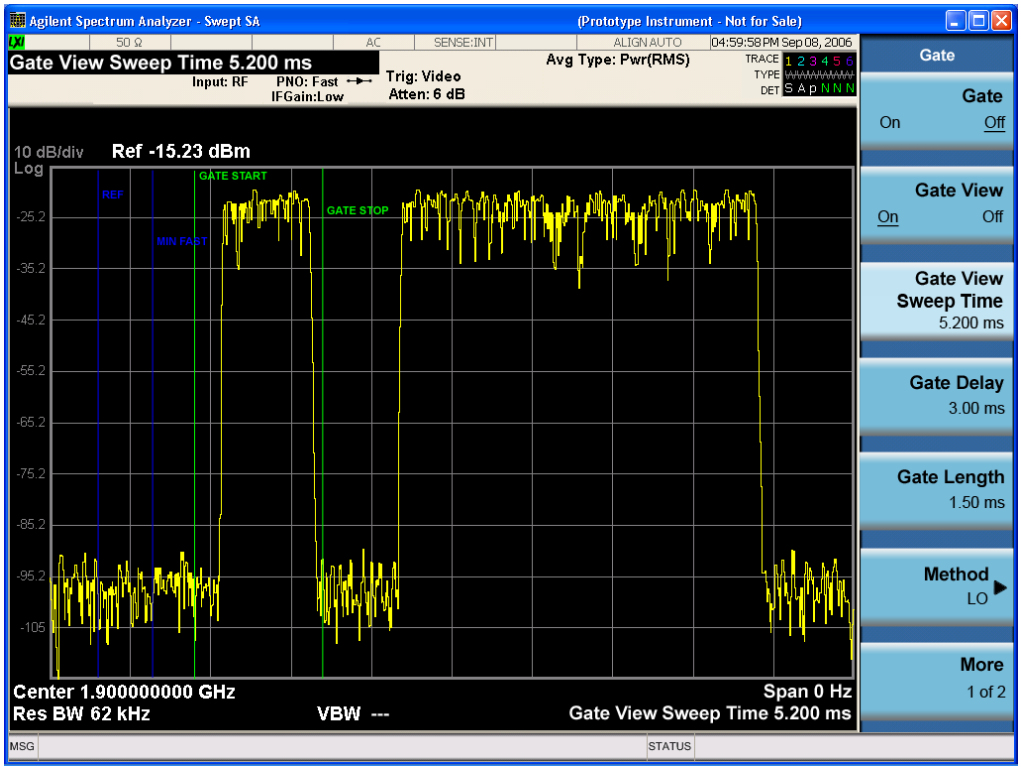
Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

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.

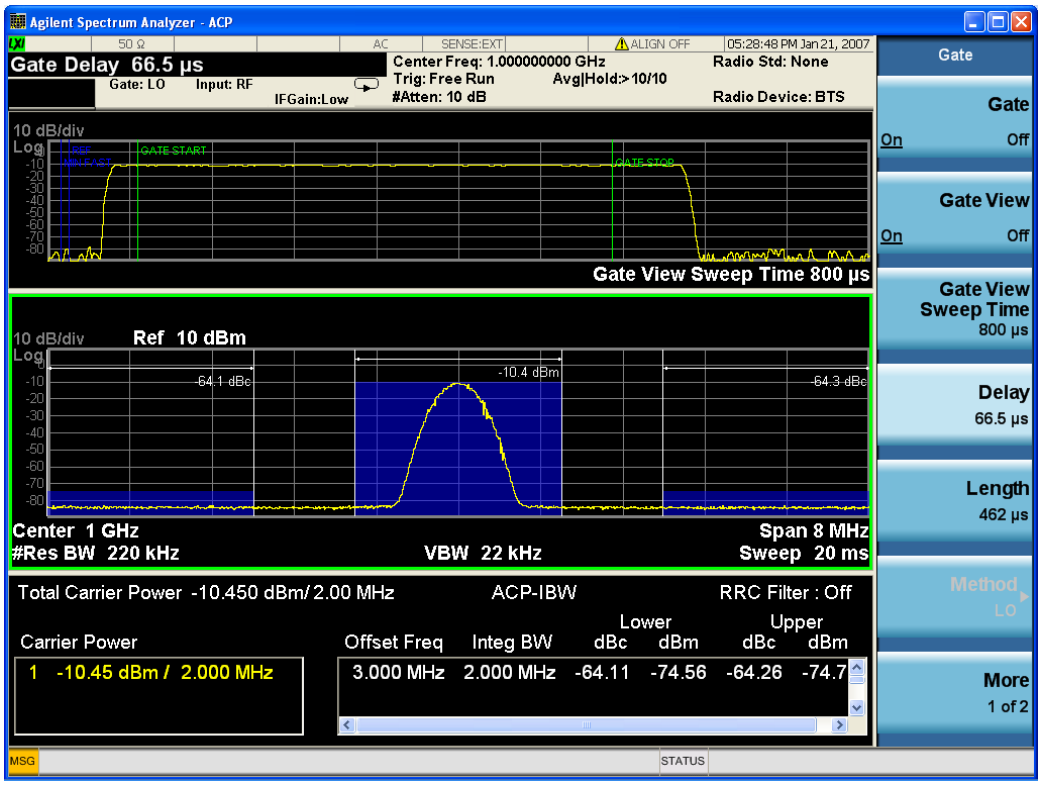
Key Path	Sweep/Control, Gate
Remote Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.
Dependencies	In the Swept SA measurement: In Gate View, the regular Acq Time key is grayed out . When pressed, the grayed out key puts up the 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: • 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 1468 • 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: • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. 1. Compute the location of the "gate stop" line, which you know is at time t = tmin + GateDelay + GateLength.
Preset	519.3 µs 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	–3.5V
Max	3.5V
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	–3.5V
Max	3.5V
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.

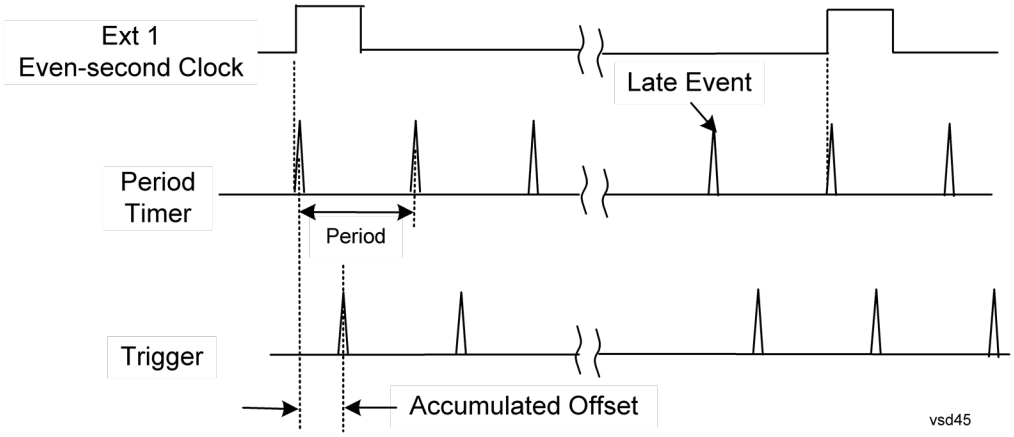
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

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	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 321. 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 321 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	–3.5V
Max	3.5V
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	–3.5V
Max	3.5V
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: • 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 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	`[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel <voltage>`
	`[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel?`
Notes	This command is simply an alias to :TRIGger[:SEQuence]:EXTernal[1]|2:LEVel 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	`[:SENSe]:SWEep:EGATe:POLarity NEGative|POSitive`
	`[:SENSe]:SWEep:EGATe:POLarity?`
Example	SWE:EGAT:POL NEG SWE:EGAT:POL?
Preset	POSitive

State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:POLarity 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 sweep time depends on the number of points selected. The current value of points is displayed parenthetically, next to the sweep 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 230

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	`[:SENSe]:OBWidth:DETector:AUTO ON|OFF|1|0` `[:SENSe]:OBWidth:DETector:AUTO?`
Example	OBW:DET:AUTO ON OBW:DET:AUTO?
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	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, LTETDD, 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	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The detector choices are: 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. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Negative Peak detector determines the minimum of the signal within the sweep points.
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 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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

11 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 1506.

This topic contains the following sections:

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:

Modes	n	Return Value
All except MSR, WLAN, LTEAFDD, LTEATDD	1	**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 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)

Modes	n	Return Value
		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, WLAN, LTEAFDD, LTEATDD	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 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)

Modes	n	Return Value
		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, WLAN, LTEAFDD, LTEATDD	1	**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)

Modes	n	Return Value
		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)
MSR, LTEAFDD, LTEATDD	1	**Meas Type: Total Power Reference** 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. Total Absolute power of carriers of Measure Carrier On if available. Otherwise –999.0 is returned. 2. Absolute reference power. Absolute power at the left reference carrier if Power Ref type is "Left & Right Carriers." Absolute power at the reference carrier of the left sub-block if Power Ref type is "Max Power Carrier in Sub-block." (dBm) 3. Absolute power at the right reference carrier if Power Ref type is "Left & Right Carriers." Absolute power at the reference carrier of the right sub-block if Power Ref type is "Max Power Carrier in Sub-block." Otherwise –999.0 is returned. (dBm) 4. Reserved for the future use, returns –999.0 5. Peak frequency in the ref carrier channel spacing frequency range. Peak frequency in the left ref carrier frequency range if Power Ref Type is "Left & Right Carriers." Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is "Max Power Carrier in Sub-block." 6. Peak frequency in the right ref carrier channel spacing frequency range if Power Ref type is "Left & Right Carriers." Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref type is "Max Power Carrier in Sub-block." Otherwise –999.0 is returned. 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)

Modes	n	Return Value
		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)
MSR , LTEAFDD, LTEATDD	1	**Meas Type: Power Spectral Density Reference** 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. Total Absolute power of carriers of Measure Carrier On if available. Otherwise –999.0 is returned. (dBm) 2. Absolute reference power. Absolute power at the left reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (dBm/Hz) 3. Absolute power at the right reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise –999.0 is returned. (dBm/Hz) 4. Reserved for the future use, returns –999.0 5. Peak frequency in the ref carrier channel spacing frequency range . Peak frequency in the left ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” 6. Peak frequency in the right ref carrier channel spacing frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise –999.0 is returned. 7. Reserved for the future use, returns –999.0

Modes	n	Return Value
		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/Hz)
		13. Relative peak power on the negative offset A (dBc)
		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 (dBc)
		17. Absolute integrated power on the positive offset A (dBm/Hz)
		18. Relative peak power on the positive offset A (dBc)
		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 (dBc)
		---
		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)
MSR, LTEAFDD, LTEATDD	1	**Meas Type: Spectrum Peak Reference** 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. Total Absolute power of carriers of Measure Carrier On if available. Otherwise –999.0 is returned. (dBm) 2. Peak reference power. Peak power at the left reference carrier if Power Ref type is “Left & Right Carriers.” Peak power at the reference carrier of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (dBm)

Modes	n	Return Value
		3. Peak power at the right reference carrier if Power Ref type is “Left & Right Carriers.” Peak power at the reference carrier of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise –999.0 is returned. (dBm)
		4. Reserved for the future use, returns –999.0
		5. Peak frequency in the ref carrier channel spacing frequency range. Peak frequency in the left ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.”
		6. Peak frequency in the right ref carrier channel spacing frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise –999.0 is returned.
		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)

Modes	n	Return Value
		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: 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)

Modes	n	Return Value
		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)

Modes	n	Return Value
		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	**Meas Type: Total Power Reference** 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 1215). 1. Total power reference (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) 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) 2. 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) 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. 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

Modes	n	Return Value
		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 1215). 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. Returns 26 comma-separated scalar values (in dBm/Hz) of the absolute integrated power of the segment frequencies: 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) --- 25. Absolute integrated power at negative offset frequency (L)

Modes	n	Return Value
		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: Spectrum Peak Reference** 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 1215). 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) --- 25. Absolute peak power at negative offset frequency (L) 26. Absolute peak 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. 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) --- 25. Absolute peak power at negative offset frequency (L) 26. Absolute peak 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: Total Power Reference** 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 (See "Number of Offsets" on page 1215). 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)

Modes	n	Return Value
		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 1215). 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 1215). 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) --- 25. Relative peak power at negative offset frequency (L) 26. Relative peak 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	7	

Modes	n	Return Value
		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 1215). 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. At negative offset frequency (A) 4. At positive offset frequency (A) --- 25. At negative offset frequency (L) 26. At positive offset frequency (L) The number of values returned is subject to change in future releases.
All	8	Offset Pass/Fail. 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 1215). 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. Note: These results (n=8) are the same as n=7 result. 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) --- 25. At negative offset frequency (L) 26. At positive offset frequency (L) The number of values returned is subject to change in future releases.
All	9	Offset Peak Power Freq. 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 1215). 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. Negative offset frequency (A)

Modes	n	Return Value
		4. Positive offset frequency (A) --- 25. Negative offset frequency (L) 26. 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	10	Offset Abs Peak Power. 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 1215). 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. At negative offset frequency (A) 4. At positive offset frequency (A) --- 25. At negative offset frequency (L) 26. 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	11	Offset Rel Peak Power. 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 1215). 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. At negative offset frequency (A) 4. At positive offset frequency (A) --- 25. At negative offset frequency (L) 26. 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	12	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. When in the MSR and LTE-Advanced FDD/TDD mode, returns outer offset results when Non-

Modes	n	Return Value
		Contiguous Meas Region is set to Outer, and returns inner offset results when it is set to Inner, in the following order.
MSR, LTEAFDD, LTEATDD only	13	**Meas Type: Total Power Reference** 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. Total Absolute power of carriers of Measure Carrier On if Power Ref Type is “Max Power Carrier,” “Max Power Carrier in Sub-block,” or “RF Bandwidth.” Otherwise NaN (9.91E+37) is returned. (dBm) 2. Absolute reference power. Absolute power at the left reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (dBm) 3. Absolute power at the right reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (dBm) 4. Peak frequency in the measured ref carrier frequency range. Peak frequency in the left ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (Hz) 5. Peak frequency in the right ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (Hz) If the result is not available, NaN (9.91E+37) is returned. The number of values returned is subject to change in future releases.
MSR, LTEAFDD, LTEATDD only	13	**Meas Type: Power Spectral Density Reference** 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. Total Absolute power of carriers of Measure Carrier On if Power Ref Type is “Max Power Carrier,” “Max Power Carrier in Sub-block,” or “RF Bandwidth.” Otherwise NaN (9.91E+37) is returned. (dBm) 2. Absolute reference power. Absolute power at the left reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (dBm/Hz) 3. Absolute power at the right reference carrier if Power Ref type is “Left & Right Carriers.” Absolute power at the reference carrier of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (dBm/Hz) 4. Peak frequency in the measured ref carrier frequency range. Peak frequency in the left ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (Hz) 5. Peak frequency in the right ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref

Modes	n	Return Value
		type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (Hz) If the result is not available, NaN (9.91E+37) is returned. The number of values returned is subject to change in future releases.
MSR, LTEAFDD, LTEATDD only	13	**Meas Type: Power Spectrum Peak Reference** 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. Total Absolute power of carriers of Measure Carrier On if Power Ref Type is “Max Power Carrier,” “Max Power Carrier in Sub-block,” or “RF Bandwidth.” Otherwise NaN (9.91E+37) is returned. (dBm) 2. Peak reference power. Peak power at the left reference carrier if Power Ref type is “Left & Right Carriers.” Peak power at the reference carrier of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (dBm) 3. Peak power at the right reference carrier if Power Ref type is “Left & Right Carriers.” Peak power at the reference carrier of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (dBm) 4. Peak frequency in the measured ref carrier frequency range. Peak frequency in the left ref carrier frequency range if Power Ref type is “Left & Right Carriers.” Peak frequency in the ref carrier frequency range of the left sub-block if Power Ref type is “Max Power Carrier in Sub-block.” (Hz) 5. Peak frequency in the right ref carrier frequency range if Power Ref type is “Left & Right Carriers” Peak frequency in the ref carrier frequency range of the right sub-block if Power Ref type is “Max Power Carrier in Sub-block.” Otherwise NaN (9.91E+37) is returned. (Hz) If the result is not available, NaN (9.91E+37) is returned. The number of values returned is subject to change in future releases.
All	14	**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. 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)

Modes	n	Return Value
		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) --- 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 1215). The number of values returned is subject to change in future releases.
All	14	**Meas Type: Power Spectral Density 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. 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 1215). 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:

Modes	n	Return Value
		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 1215). 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 1215). The number of values returned is subject to change in future releases.
MSR, LTEAFDD,	16	

Modes	n	Return Value
LTEATDD only		Returns number of carriers comma-separated scalar results, in the following order: 1. Absolute power of carrier 1 (dBm) 2. Absolute power of carrier 2 (dBm) --- number of carriers–1. Absolute power of carrier (number of carriers)–1 (dBm) number of carriers. Absolute power of carrier (number of carriers)–1 (dBm) If Measure Carrier of the corresponding carrier is no, NaN (9.91E+37) is returned.
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)
MSR, LTEAFDD, LTEATDD only	17	Returns the displayed frequency domain combined limit trace data separated by comma. Combined trace is a mixed trace of both absolute limit trace and relative limit trace according to the fail mask condition. The number of data points is 2001.

Number of Offsets

The number of available offsets varies depending on the mode and option as below.

Mode	The number of available offsets
MSR, LTEAFDD, LTEATDD	12 (Offset A to L)
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)

Key Path	Meas
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00, A.14.00

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 Internal Preamp selections that are measurement global.

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 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.

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

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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined`

	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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.

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]: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

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.

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]: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

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.

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

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 keyactions 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 1221

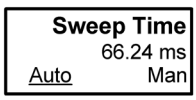
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

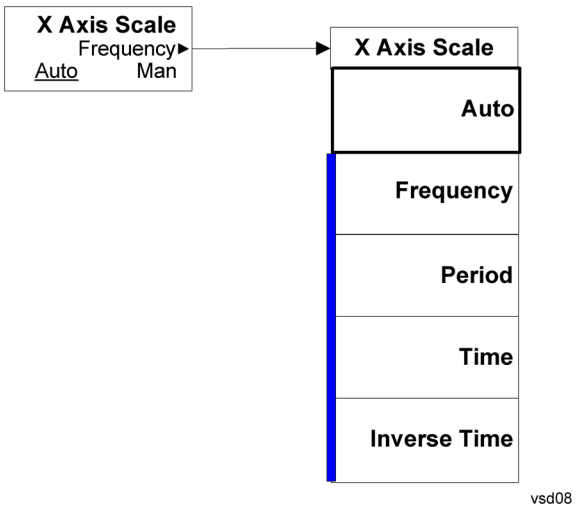
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
vsd08

BW

Accesses a menu of functions that enable you to select the type of filter for the measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

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.

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

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 224

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 1230

See Ext Mix Center Freq

See "I/Q Center Freq" on page 1232

See "Center Frequency Presets" on page 1228

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 1228 and "RF Center Freq" on page 1230 and Ext Mix Center Freq and "I/Q Center Freq" on page 1232.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1228 and "RF Center Freq" on page 1230 and "I/Q Center Freq" on page 1232.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1228 and "RF Center Freq" on page 1230 and "I/Q Center Freq" on page 1232.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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 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

Input/Output

See "Input/Output" on page 176

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.

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 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.

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

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).

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

All Markers Off

Turns all active markers off in all views.

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

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.

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. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 1.5 GHz.
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

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.

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. Therefore the default value depends on the instrument condition although the Preset/Default is defined as 6507 (this value might be the expected value when all the offsets are on).
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

Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

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

Marker Function

There are no ‘Marker Functions’ supported in Spectrum Emission Mask 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 Spectrum Emission Mask 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

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.**

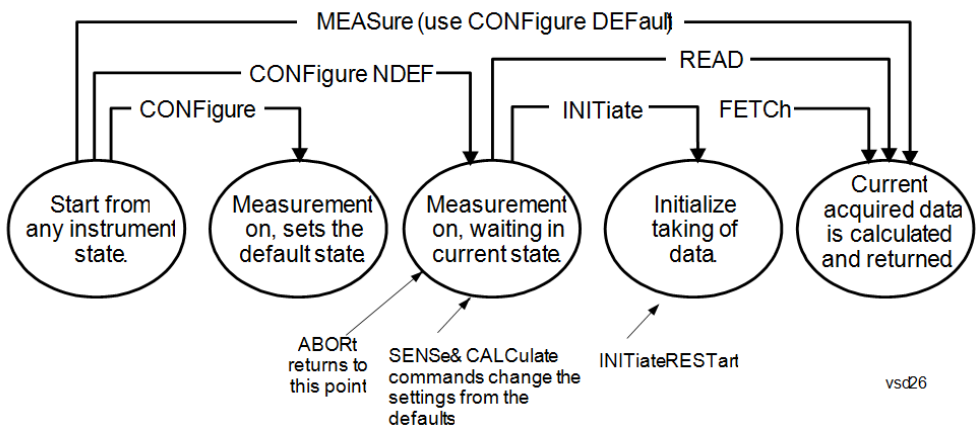
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} Xi$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} |Xi|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in \text{region(s)}} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi\ Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

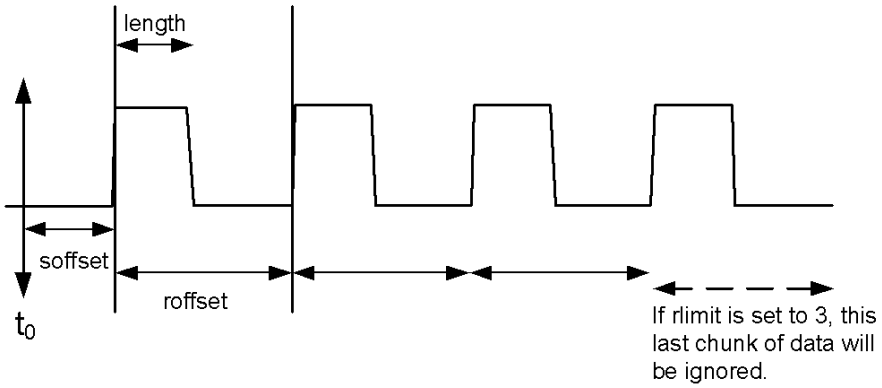
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

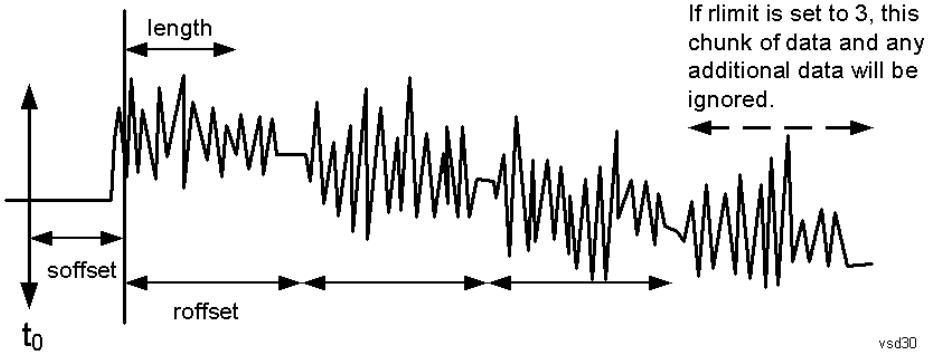
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

xample	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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.

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

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.

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: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

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.

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|TPRef|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: TPRef 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

Ref Channel

Accesses a menu that enables you to set up the measurement parameters used to calculate the power in the reference channel.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

Integ BW

Specifies the integration bandwidth used to calculate the power in the reference channel.

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
Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2:INTegration <bandwidth>` `[:SENSe]:SEMask:BANDwidth[1]|2:INTegration?`

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. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SELect to set the mode.
Dependencies	For MSR and LTE-Advanced FDD/TDD mode, this key is blank.
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: 4.515MHz|4.5MHz LTETDD: 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)/ 802.11ac (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): 78 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	645 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Span

Specifies the span used to calculate the power in the reference channel.

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
Remote Command	`[:SENSe]:SEMask:FREQuency[1]|2:SPAN <freq>` `[:SENSe]:SEMask:FREQuency[1]|2:SPAN?`
Example	SEM:FREQ:SPAN 3MHz SEM:FREQ:SPAN?
Notes	Frequency sub op code, 1 is 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	For MSR and LTE-Advanced FDD/TDD mode, this key is blank.
Couplings	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 802.11ac (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;
Preset	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: 5 MHz LTETDD: 5 MHz Digital Cable TV: 10 MHz 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)/ 802.11ac (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
State Saved	Saved in instrument state.
Min	1 kHz
Max	645 MHz

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

Sweep Time

Sets the sweep time used to calculate the power in the reference channel. Sweep Time can be set manually or put in auto mode.

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. 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 Sweep Time is automatically calculated
Preset	Automatically calculated ON
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

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.

Key Path	Meas Setup, Ref Channel
Initial S/W Revision	Prior to A.02.00

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.

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

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.

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

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

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

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.

MSR Auto RBW:

In the MSR resolution bandwidth is predefined for each radio format. When carriers are configured with multiple radio formats, the narrowest RBW is selected.

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.

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. 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 Sweep 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	`[:SENSe]:SEMask:BWIDth[1]|2[:RESolution]`
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00, A.03.00

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.

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: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?`

Example	SEM:BAND:VID 100 kHz SEM:BAND:VID? SEM:BAND:VID:AUTO ON SEM:BAND:VID:AUTO?
Notes	Bandwidth sub op code, 1 is 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.
Couplings	When Video BW is set manually, Channel Video BW Mode is set to MANual Value is coupled with Channel Detector selection, Channel Sweep 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

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.

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	`[: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?`

Example	SEM:BAND:VID:RAT 0.1 SEM:BAND:VID:RAT? SEM:BAND:VID:RAT:AUTO ON SEM:BAND:VID:RAT:AUTO?
Notes	Bandwidth sub op code, 1 is 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.
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

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 sweep time. When in the MSR and LTE-Advanced FDD/TDD mode, the softkey label changes to Outer Offset/Limits.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

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, Sweep Time, Res BW, Meas BW, Abs Start, and Abs Stop. Only one selection at a time is shown on this menu key label.

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|I|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|I|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

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.

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:STARt <freq>, …`
	`[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:FREQuency:STARt?`
	`[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STATe ON|OFF|1|0, …`
	`[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:STATe?`

Example	SEM:OFFS2:LIST:FREQ:STAR 2.515 MHz, , 2.715 MHz, , 3.515 MHz, , 4.00 MHz, , 8.00 MHz, , 12.50 MHz SEM:OFFS2:LIST:FREQ:STAR? SEM:OFFS:LIST:STAT ON, , ON, , ON, , OFF, , OFF, , OFF SEM:OFFS:LIST:STAT?
Notes	 Comma separated list of values. OFFSet1 is 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.
Couplings	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. 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: 2.515 MHz, , 2.715 MHz, , 3.515 MHz, , 4.00 MHz, , 8.00 MHz, , 12.50 MHz 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 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 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 TD-SCDMA: 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 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 DTMB (CTTB): 3.8 MHz, , 4.2 MHz, , 6 MHz, , 6 MHz, , 6 MHz, 6 MHz |6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz DVB-T/H: 3.81 MHz, , 4.2 MHz, , 6 MHz, , 6 MHz, , 6 MHz, , 6 MHz |6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz ISDB-T: 2.79 MHz, , 2.86 MHz, , 3.0 MHz, , 4.36 MHz, , 6 MHz, , 6 MHz |6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz CMMB: 3.8 MHz, , 4.2 MHz, , 8.0 MHz, , 6 MHz, , 6 MHz, , 6 MHz |6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz 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 Digital Cable TV: 3.8 MHz, , 4.2 MHz, , 6 MHz, , 6 MHz, , 6 MHz, , 6 MHz |6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz, , 6MHz 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): 9 MHz, , 11 MHz, , 20 MHz, , 30 MHz, , 50 MHz, , 216 MHz, , 216 MHz, , 216 MHz, , 216 MHz, , 216 MHz, , 216 MHz, , 216 MHz

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, , 100 MHz

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

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

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

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

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

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

if Radio Std is 802.11ac(80 MHz + 80MHz): 0 MHz, , 40 MHz, , 79 MHz, , 159 MHz, , 161 MHz, , 200 MHz, , 240 MHz, , 240 MHz, , 240 MHz, , 240 MHz, , 240 MHz, , 240 MHz

MSR:15 kHz, , 215kHz, , 1.015MHz, , 1.5MHz, , 10.5MHz, , 15.00MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz | 15kHz, , 215kHz, , 1.015MHz, , 1.5MHz, , 10.5MHz, , 15.00MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz, , 30MHz

LTEAFDD, , LTEATDD: 50 kHz, , 5.05 MHz, , 10.5 MHz, , 15.00 MHz, , 30 MHz, , 40 MHz, , 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz, 40 MHz | 15.00 kHz, 1.5 MHz, 5.5 MHz, 6.5 MHz, 10 MHz, 20MHz, , 20MHz, , 20MHz, , 20MHz, , 20MHz, , 20MHz, , 20MHz

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

DTMB (CTTB), , DVB-T/H, , CMMB, , Digital Cable TV: ON, , ON, , ON, , OFF, , OFF, , OFF

ISDB-T: ON, ON, ON, ON, OFF, OFF

LTE, , LTETDD: 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

if Radio Std is 802.11a/g(OFDM/DSSS-OFDM)/802.11n(20MHz/40MHz): ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF

	if Radio Std is 802.11ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF if Radio Std is 802.11ac (80 MHz + 80 MHz): ON, , ON, , ON, , ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF MSR:ON, , ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|ON, , ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF LTEAFDD, , LTEATDD: ON, , ON, , ON, , OFF, , OFF, , OFF, OFF, , OFF, , OFF, , OFF, OFF, OFF | ON, , ON, , ON, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF
State Saved	Saved in instrument state.
Min	0 Hz
Max	499.9999 MHz
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

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.

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. 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 MHz4 .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

DTMB (CTTB): 4.2 MHz, , 6 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz |12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz

DVB-T/H: 4.2 MHz, , 6 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz |12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz

ISDB-T: 2.86 MHz, , 3.0 MHz, , 4.36 MHz, , 15.0 MHz, , 15.0 MHz, , 15.0 MHz |15MHz, , 15MHz, , 15MHz, , 15MHz, , 15MHz, , 15MHz

CMMB: 4.2 MHz, , 8.0 MHz, , 12.0 MHz, 12.0 MHz, , 12.0 MHz, , 12.0 MHz |12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz

LTE, , LTETDD: 5.05 MHz, , 10.05 MHz, , 15 MHz, , 30 MHz, , 40 MHz, , 50 MHz|985.0 kHz, , 4.50 MHz, , 5.5001 MHz, , 9.50 MHz, 20 MHz, , 40 MHz

Digital Cable TV: 4.2 MHz, , 6.0 MHz, , 12.0 MHz, 12.0 MHz, , 12.0 MHz, , 12.0 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 MHz, , 12 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 802.11a/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 802.11b/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 802.11ac(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 802.11ac(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 802.11ac(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 802.11ac(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 802.11ac(80 MHz + 80MHz): 40 MHz, , 79 MHz, , 81 MHz, , 161 MHz, , 200 MHz, ,

	240 MHz, , 260 MHz, , 260 MHz, , 260 MHz, , 260 MHz, , 260 MHz, , 260 MHz MSR: 215kHz, , 1.015MHz, , 1.5MHz, , 10.5MHz, , 50MHz, , 50MHz, , 50MHz, , 50MHz, , 50MHz, , 50MHz, , 50MHz, , 50MHz LTEAFDD, , LTEATDD: 5.05 MHz, , 10.05 MHz, , 15 MHz, , 30 MHz, , 40 MHz, , 50 MHz, , 50 MHz, , 50 MHz, , 50 MHz, , 50 MHz, , 50 MHz, , 50 MHz | 985.0 kHz, , 4.50 MHz, , 5.5001 MHz, , 9.50 MHz, 20 MHz, , 40 MHz , , 40 MHz, , 40 MHz, , 40 MHz, , 40 MHz, , 40 MHz, , 40 MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	500 MHz
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

Sweep Time

Specifies the sweep time for the currently selected offset and enables you to toggle the Sweep 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.

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. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SELect to set the mode.
Couplings	When the sweep time is set manually, Sweep 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 MSR: ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON LTEAFDD, , LTEATDD: ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON | ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	1 ms
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

Offset Side

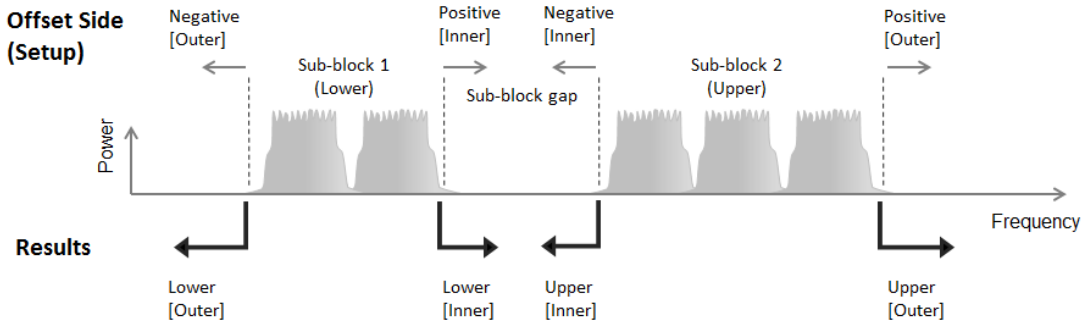
Specifies which offset side to measure.

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.



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:SIDE BOTH | NEGative | POSitive, …` `[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:SIDE?`
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. 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 MSR: BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH LTEAFDD, LTEATDD: BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , BOTH, , 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
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

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 x Res BW) <= (Stop freq of the offset - 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.

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, LTETDD, 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. 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, , 1.000 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 DTMB (CTTB), , DVB-T/H, , CMMB, , Digital Cable TV: 3.9 kHz, , 3.9 kHz, , 3.9 kHz, , 3.9 kHz, , 3.9 kHz, , 3.9 kHz |30.00 kHz, , 1.000 MHz, , 1.000 MHz, , 1.000 MHz, , 1.000 MHz, , 1.00 MHz ISDB-T: 10.0 kHz, , 10.0 kHz, , 10.0 kHz, , 10.0 kHz, , 10. kHz, , 10.0 kHz |30.00 kHz, , 1.000 MHz, , 1.000 MHz, , 1.000 MHz, , 1.000 MHz, , 1.00 MHz LTE, , LTETDD: 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: 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz, , 100 KHz

	MSR: 30kHz, , 30kHz, , 30kHz, , 1.0MHz, 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz	30kHz, , 30kHz, , 30kHz, , 1.0MHz, 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, , 1.0MHz, 1.0MHz LTEAFDD, , LTEATDD: 51 kHz, , 100 kHz, , 1.0 MHz, , 1.0 MHz, 1.0 MHz, , 1.0 MHz, 1.0 MHz, 1.0 MHz, 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 , 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz 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, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF MSR: OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF LTEAFDD, , LTEATDD: OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF WLAN: OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF |OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF
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

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.

Integ BW = Meas BW * 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.

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	`[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:IMULti <integer>, …` `[:SENSe]:SEMask:OFFSet[1]|2[:OUTer]:LIST:BANDwidth:IMULti?`
Example	SEM:OFFS2:LIST:BAND:IMUL 1,1,1,1,1,1 SEM:OFFS2:LIST:BAND:IMUL?
Notes	Comma separated list of values. OFFSet1 is for BTS, 2 for MS. Default is BTS. 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 TD-SCDMA:1, , 1, , 1, , 20, , 1, , 1|1, , 1, , 20, , 1, , 1, , 1 DTMB (CTTB), , DVB-T/H, , ISDB-T, , CMMB, , Digital Cable TV: 1, , 1, , 1, , 1, , 1, , 1 |1, , 1, , 1, , 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 MSR: 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1|1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1 LTEAFDD, , LTEATDD: 2, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1|2, , 2, , 1, , 1, , 1, 1, , 1, , 1, , 1, , 1, , 1, , 1, , 1
State Saved	Saved in instrument state.
Min	1
Max	1000
Backwards Compatibility SCPI	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BWIDth:IMULti`
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

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.

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. 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, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON|ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON ---------- MSR, , LTEAFDD, , LTEATDD: ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON|ON, , ON, , ON, , 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, , ON |ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON ISDB-T: OFF, , OFF, , OFF, , OFF, , OFF, , OFF| OFF, , OFF, , OFF, , OFF, , OFF, , OFF
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

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.

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. 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 DTMB (CTTB), , DVB-T/H, , CMMB, , Digital Cable TV: 10, , 10, , 10, , 10, , 10, , 10 |10, , 10, , 10, , 10, , 10, , 10 ISDB-T: 0.1, , 0.1, , 0.1, , 0.1, , 0.1, , 0.1 |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: 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3, , 0.3 MSR, , LTEAFDD, , LTEATDD: 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01|0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01, , 0.01 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, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF MSR, , LTEAFDD, , LTEATDD: OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , 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

Limits

Accesses a menu that enables you to set the power limits for start and stop frequencies of the selected offsets.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

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, Sweep Time, Res BW, Meas BW, Abs Start, and Abs Stop. Only one selection at a time is shown on this menu key label.

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|I|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|I|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

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.

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, LTETDD, 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. 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, , –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, , –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 DTMB (CTTB): –14.0 dBm, , –14.0 dBm, , –26.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm |–13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm DVB-T/H: 11.2 dBm, , –29 dBm, , –41 dBm, , –66 dBm, , –82 dBm, , –82 dBm |–82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, ISDB-T, , CMMB, , Digital Cable TV: 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm |50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 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 802.11a/g(OFDM/DSSS-OFDM): 16.00 dBm, , –4.00 dBm, , –12.00 dBm, , –

	24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm 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 if Radio Std is 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 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 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 MSR: –12.5 dBm, , –12.5 dBm, , –24.5 dBm, , –11.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm| –12.5 dBm, , –12.5 dBm, , –24.5 dBm, , –11.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm LTEAFDD, , LTEATDD: –5.5 dBm, , –12.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 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, , –23.5 dBm, , –23.5 dBm, , –23.5 dBm, , –23.5 dBm, , –23.5 dBm, , –23.5 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

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.

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: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. 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, , –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, , –70.13 dBm DTMB (CTTB): –14.0 dBm, , –26.0 dBm, , –26.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm |–13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm, , –13.0 dBm DVB-T/H: –29 dBm, , –41 dBm, , –66 dBm, , –82 dBm, , –82 dBm, , –82 dBm |–82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, , –82 dBm, ISDB-TCMMB, , Digital Cable TV: 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm |50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm, , 50.0 dBm LTE, , LTETDD:–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 802.11a/g(OFDM/DSSS-OFDM): –4.00 dBm, , –12.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm, , –24.00 dBm

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

if Radio Std is 802.11n(20MHz) or 802.11ac(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 802.11n(40MHz) or 802.11ac(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 802.11ac(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 802.11ac (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, , –69.00 dBm

MSR:–12.5 dBm, , –24.5 dBm, , –11.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm| –12.5 dBm, , –24.5 dBm, , –11.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm

LTEAFDD, , LTEATDD:–12.5 dBm, , –12.5 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 dBm, , –15.0 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 –23.5 dBm, , –23.5 dBm, , –23.5 dBm, , –23.5 dBm, , –23.5 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

DTMB (CTTB): ON, OFF, ON, ON, ON, ON

DVB-T/H, , ISDB-T, , CMMB, , Digital Cable TV: OFF, , OFF, , OFF, , OFF, , OFF, , OFF

LTE, , LTETDD: 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): 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, , 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 MSR: ON, , OFF, , OFF, , OFF, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF|ON, , OFF, , OFF, , OFF, , ON, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF LTEAFDD, , LTEATDD: OFF, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON|ON, , 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

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.

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. OFFSet1 is 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.
Couplings	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. 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 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, –40.00 dB
Preset	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|–33.73 dB, , –34.00 dB, , –37.50 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: 0 dB, , –25 dB, , –32 dB, , –50 dB, , –50 dB, , –50 dB 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 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 DTMB (CTTB): –32.8 dB, , –83 dB, , –95 dB, , –120 dB, , –120 dB, , –120 dB |–120 dB, , –120 dB, , –120 dB, , –120 dB, , –120 dB DVB-T/H: –30 dB, , –30 dB, , –30 dB, , –30 dB, , –30 dB, , –30 dB |–30 dB, , –30 dB, , –30 dB, , –30 dB, , –30 dB, , –30 dB ISDB-T: –27.4 dB, , –47.4 dB, , –54.4 dB, , XXX, , 50 dB, , 50 dB | 50 dB, , 50 dB, , 50 dB, , 50 dB, , 50 dB, , 50 dB; XXX is coupled with the total power reference, , it is –57.4 dB when P<=0.025 W, , –67.4 dB when P=0.25W, , -(73.4 + 10logP) dB when 0.25 W<P<=2.5 W or 0.025 W<P<0.25 W, , –77.4 dB when P > 2.5 W. CMMB: –37 dB, , –72 dB, , –84 dB, , –90 dB, , –90 dB, , –90 dB|–90 dB, , –90 dB, , –90 dB, , –90 dB, , –90 dB, , –90 dB 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 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): 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 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): 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, , –45.00 dB if Radio Std is 802.11ac (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, , –40.00 dB if Radio Std is 802.11ac(80 MHz + 80MHz): –40.00 dB, , –28.00 dB, , –20 dB, , 0 dB, , – 20 dB, , –28 dB, , –40 dB, , –40 dB, , –40.00 dB, , –40.00 dB, , –40.00 dB, , –40.00 dB MSR, , LTEAFDD, , LTEATDD: 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, ,

	0 dB, , 0 dB|0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 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

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.

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. You must be in the mode that includes SEM measurement to use this command. Use :INSTrument:SELect to set the mode.
Couplings	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
Preset	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 DTMB (CTTB): –83 dB, , –95 dB, , –120 dB, , –120 dB, , –120 dB, , –120 dB |–120 dB, , –120 dB, , –120 dB, , –120 dB, , –120 dB DVB-T/H: –73 dB, , –85 dB, , –110 dB, , –126 dB, , –126 dB, , –126 dB |–126 dB, , –126 dB, , –126 dB, , –126 dB, , –126 dB ISDB-T: –47.4 dB, , –54.4 dB, , XXX, , 50 dB, , 50 dB, , 50 dB |50 dB, , 50 dB, , 50 dB, , 50 dB, , 50 dB, , 50 dB; XXX is coupled with the total power reference P, , it is –57.4 dB when P<=0.025 W, , –67.4 dB when P=0.25 W, , -(73.4 + 10logP) dB when 0.25 W<P<=2.5 W or 0.025 W<P<0.25 W, , –77.4 dB when P > 2.5 W. CMMB: –72 dB, , –84 dB, , –90 dB, , –90 dB, , –90 dB, , –90 dB |–90 dB, , –90 dB, , –90 dB, , –90 dB, , –90 dB, , –90 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, , –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, , –40.00 dB, , –40.00 dB if Radio Std is 802.11ac(80 MHz + 80MHz): –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 MSR, , LTEAFDD, , LTEATDD: 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB|0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 dB, , 0 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 WCDMA: ON, , ON, , ON, , ON, , ON, , ON|OFF, , OFF, , OFF, , ON, , ON, , ON C2K: 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, , OFF| ON, , ON, , ON, , ON, , ON, , OFF DTMB (CTTB): OFF, , OFF, , OFF, , OFF, , OFF, , OFF DVB-T/H: ON, ON, ON, ON, ON, ON ISDB-T: OFF, OFF, OFF, OFF, OFF, OFF CMMB: OFF, OFF, OFF, OFF, OFF, OFF LTE, LTETDD: ON, ON, ON, ON, ON, ON Digital Cable TV: OFF, , OFF, , OFF, , OFF, , OFF, , OFF ---------- WLAN: if Radio Std is 802.11a/g(OFDM/DSSS-OFDM)/802.11n(20MHz/40MHz): OFF, , OFF, , OFF, , 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 if Radio Std is 802.11ac (20 MHz/ 40 MHz/ 80 MHz/ 160 MHz): OFF, , OFF, , OFF, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON if Radio Std is 802.11ac(80 MHz + 80MHz): OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF, , OFF MSR, , LTEAFDD, , LTEATDD: ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON, , ON | ON, , 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

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.

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. 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 DTMB (CTTB), , ISDB-T, , CMMB: REL, , REL, , REL, , REL, , REL, , REL | REL, , REL, , REL, , REL, , REL, , REL DVB-T/H: ABS, , ABS, , ABS, , ABS, , ABS, , ABS | ABS, , ABS, , ABS, , ABS, , ABS, , ABS LTE, , LTDTDD: 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 802.11a/g(OFDM/DSSS-OFDM) or 802.11b/g(DSSS/CCK/PBCC): REL, , REL, , REL, , REL, , REL, , REL, , REL, , REL, , REL, , REL, , REL if Radio Std is 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): REL, , REL, , REL, , REL, , REL, , REL, , AND, , AND, , AND, , AND, , AND, , AND, , AND MSR, , LTEAFDD, , LTEATDD: ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS, , ABS
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

Offset Freq Define

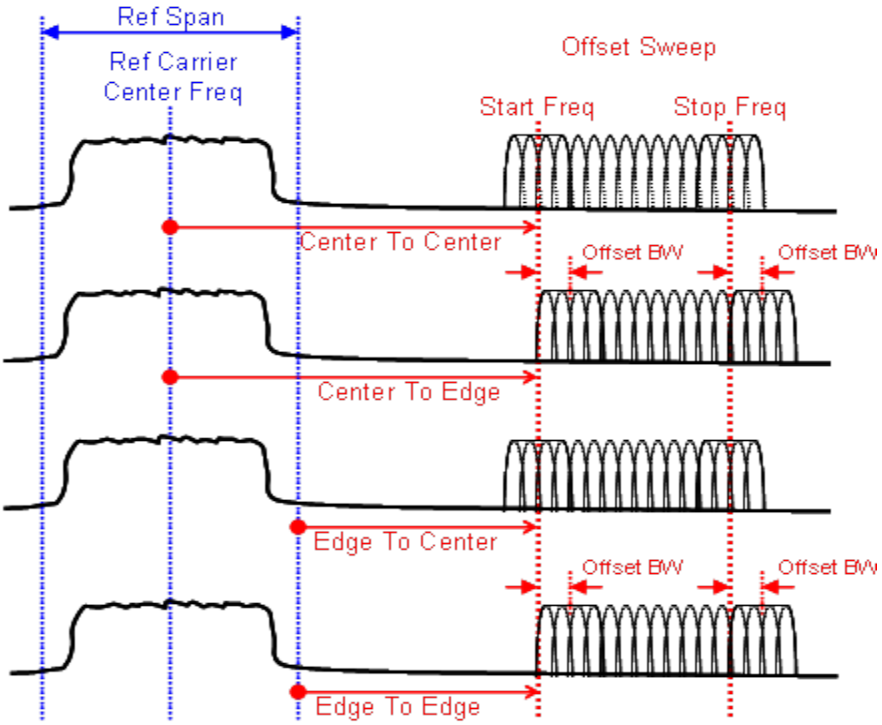
This key enables you to select “Offset” definition. Each standard defines each “Offset” from Carrier.

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.

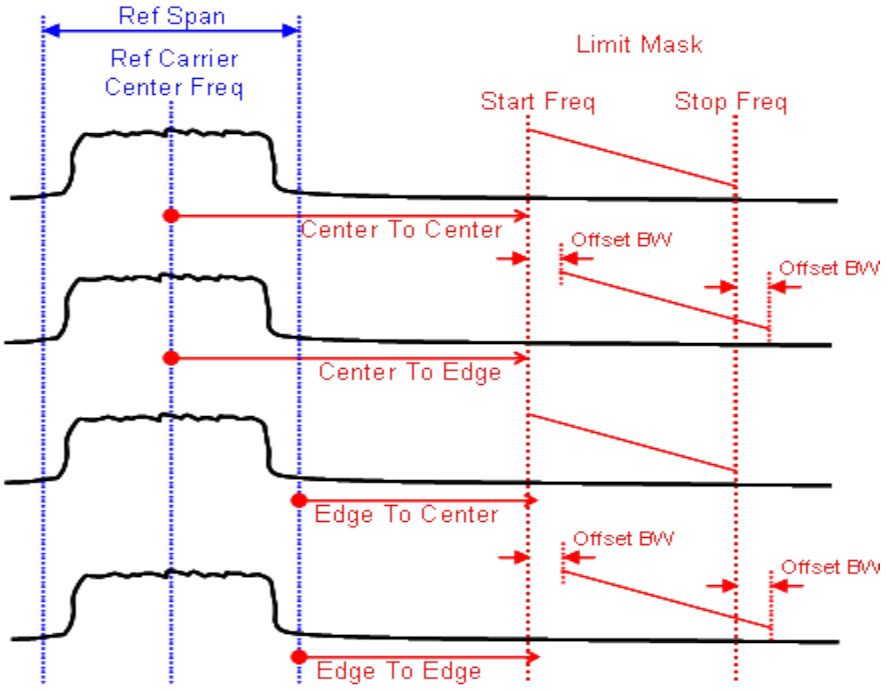
3GPP2 requires the “Carrier Center to Meas BW Edge” definition. LTE conformance test requires “Carrier Edge to Meas BW Center” and/or “Carrier Edge to Meas BW Edge” definition

- 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



Offset BW: ½ (Meas BW * Res BW)



Offset BW: ½ (Meas BW * Res BW)

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	You must be in the mode that includes SEM measurements to use this command. Use :INSTrument:SELect to set the mode. For the MSR and LTE-Advanced FDD/TDD mode, see Offset Freq Define (Only for MSR and LTE-Advanced FDD/TDD).
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

Meas Preset

Restores all the measurement parameters to their default values.

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

Mode

See "Mode" on page 200

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 1308 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 219

Peak Search

There is no ‘Peak Search’ supported in Spectrum Emission Mask 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

Print

See "Print " on page 229

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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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 1317.

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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

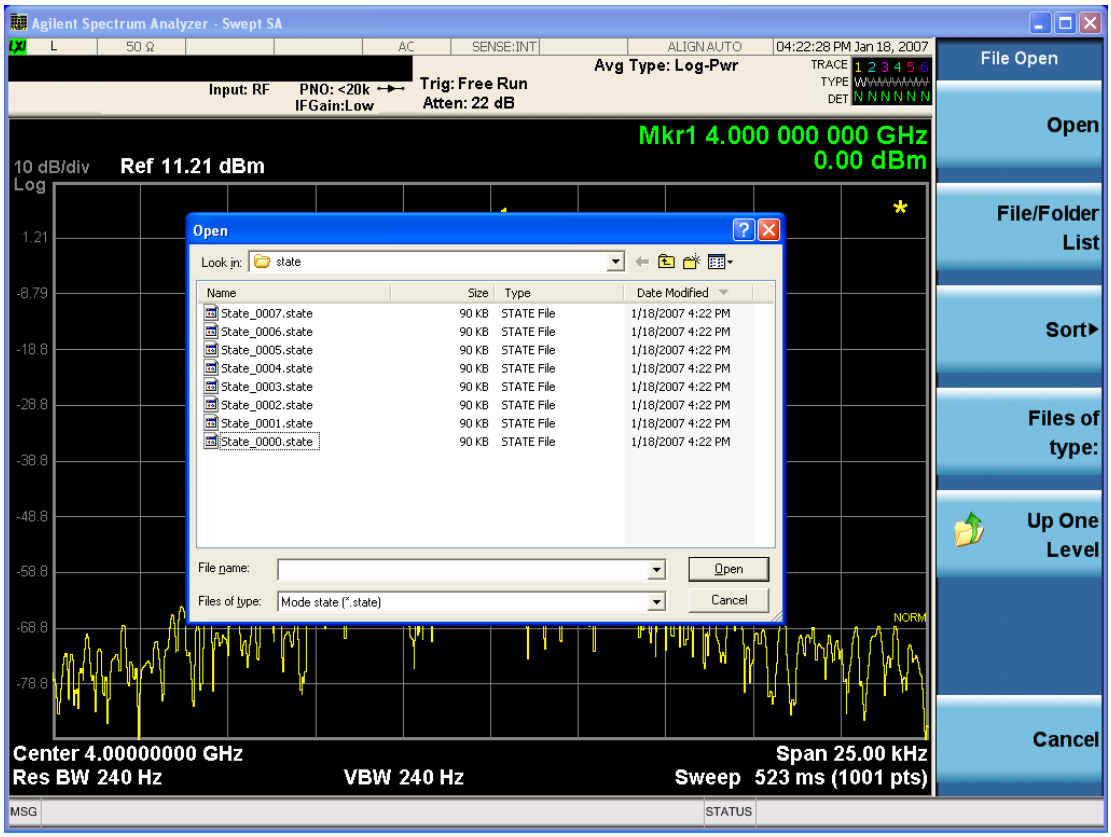
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode's state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled Trace Register <register number>" is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

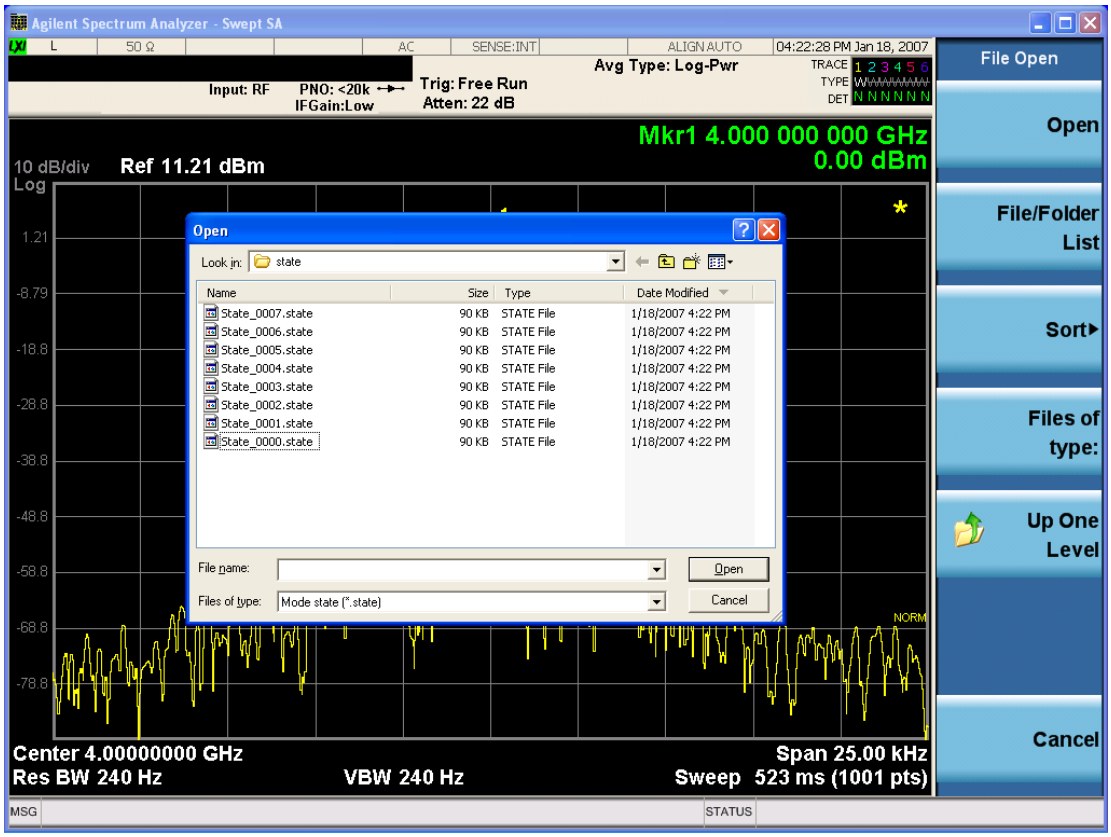
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 1328

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

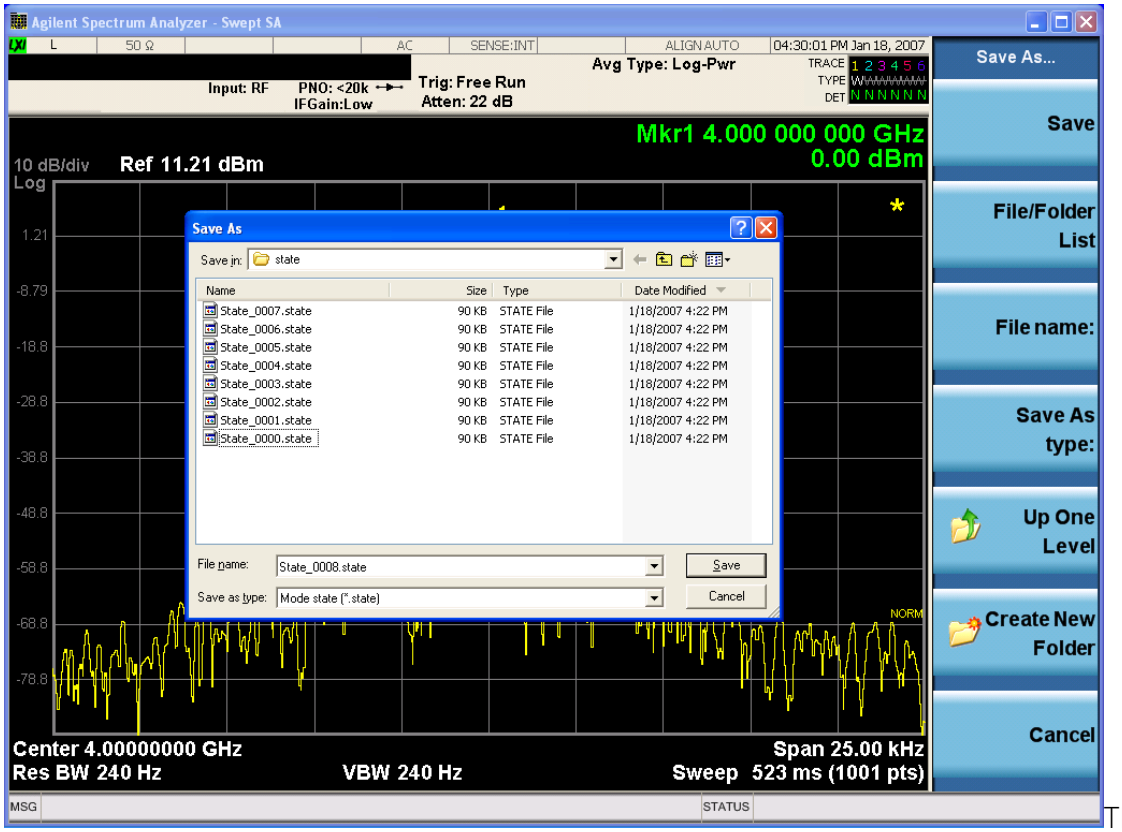
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 1333

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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

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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	The string must be a valid logical path. 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. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
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	The string must be a valid logical path. Copies 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.

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	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. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information that describes the current state of the analyzer. It is detailed in "Meas Results File Contents" on page 1342 below.

Key Path	Save, Data
Remote Command	`:MMEMory:STORe:RESults <string>`
Example	:MMEM:STOR:RES “MeasR_0000.csv”
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten. The SCPI command exports Spectrum Emission Mask measurement results to the file specified as the parameter in the current path. The default path is My Documents\<current mode>\data\SEM\results.

	Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Spectrum Emission Mask measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is “MeasResult”
- Measurement ID following Mode ID, which is “SA:SEM” for example.
- Firmware rev and model number
- Option string
- Automatic Trigger Time
- Automatic Trigger Time State
- Center Frequency
- ChanIntegBW
- ChannelDetector
- ChannelDetectorState
- ChanPwrRefAuto
- ChanResBW
- ChanResBWAuto
- ChanSpan
- ChanSweepTime
- ChanSweepTimeAuto
- ChanVbwRbwRatio
- ChanVbwRbwRatioAuto
- ChanVideoBW
- ChanVideoBWAuto
- Electrical Atten

- Electrical Atten Bypass
- Electrical Atten State
- External1 Trigger Delay
- External1 Trigger Delay State
- External1 Trigger Level
- External1 Trigger Slope
- External2 Trigger Delay
- External2 Trigger Delay State
- External2 Trigger Level
- External2 Trigger Slope
- FilterAlpha
- Internal Preamp
- Internal Preamp Band
- Line Trigger Delay
- Line Trigger Delay State
- Line Trigger Slope
- Mechanical Atten
- Mechanical Atten Auto
- OffsetDetector
- OffsetDetectorState
- OffsetLimitAbsStartBTS
- OffsetLimitAbsStartMS
- OffsetLimitAbsStopBTS
- OffsetLimitAbsStopMS
- OffsetLimitFailMaskBTS
- OffsetLimitFailMaskMS
- OffsetLimitRelStartBTS
- OffsetLimitRelStartMS
- OffsetLimitRelStopBTS
- OffsetLimitRelStopMS
- OffsetMeasBWBTS

- OffsetMeasBWMS
- OffsetResolutionBWAutoBTS
- OffsetResolutionBWAutoMS
- OffsetResolutionBWBTS
- OffsetResolutionBWMS
- OffsetSideBTS
- OffsetSideMS
- OffsetStartFrequencyBTS
- OffsetStartFrequencyMS
- OffsetStateBTS
- OffsetStateMS
- OffsetStopFrequencyBTS
- OffsetStopFrequencyMS
- OffsetSweepTimeAutoBTS
- OffsetSweepTimeAutoMS
- OffsetSweepTimeBTS
- OffsetSweepTimeMS
- OffsetVbwRbwRatioAutoBTS
- OffsetVbwRbwRatioAutoMS
- OffsetVbwRbwRatioBTS
- OffsetVbwRbwRatioMS
- OffsetVideoBWAutoBTS
- OffsetVideoBWAutoMS
- OffsetVideoBWBTS
- OffsetVideoBWMS
- PeakReference
- Periodic Timer Period
- Periodic Timer Sync Source
- Periodic Timer Trigger Delay
- Periodic Timer Trigger Delay State
- PowerReference

- PSDReference
- Radio Device
- RFBurst Trigger Delay
- RFBurst Trigger Delay State
- RFBurst Trigger Level Abs
- RFBurst Trigger Level Rel
- RFBurst Trigger Level Type
- RFBurst Trigger Slope
- RrcFilter
- SemAverageNumber
- SemAverageState
- TotalAtten
- Trigger Holdoff
- Trigger Holdoff State
- TriggerSource
- Video Trigger Delay
- Video Trigger Delay State
- Video Trigger Level
- Video Trigger Slope
- ViewSelection

The file contains these data followed by MeasResult1 to MeasResult12 that flag the start of the measurement results. Each line of Measurement Results consists of twelve comma separated values from MeasResult1 value to MeasResult12 value. MeasResult1 contains the same results as MEAS/READ/FETCh:SEMask1; MeasResult2, MEAS/READ/FETCh:SEMask2; MeasResult3, MEAS/READ/FETCh:SEMask3;... (continues in the same manner)

The exported file is in CSV format, with a.csv extension. The Meas Results file, when imported into Excel, shows the following data:

MeasResult	
SA:SEM	
A.10.53	N90 30A
526 ALV ATP B1X B1Y B25 B40 BBA CR3	1

CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV		
Automatic Trigger Time	0.1	
Automatic Trigger Time State	FALSE	
Center Frequency	1.33E+10	
ChanIntegBW	3840000	3840000
ChannelDetector	Average	
ChannelDetectorState	TRUE	
ChanPwrRefAuto	TRUE	
ChanResBW	100000	100000
ChanResBWAuto	FALSE	FALSE
ChanSpan	5000000	5000000
ChanSweepTime	0.002507	0.002507
ChanSweepTimeAuto	TRUE	TRUE
ChanVbwRbwRatio	1	1
ChanVbwRbwRatioAuto	FALSE	FALSE
ChanVideoBW	100	100

	000	000
ChanVideoBW Auto	TRUE	TRUE
Electrical Atten	0	
Electrical Atten Bypass	TRUE	
Electrical Atten State	FALSE	
External1 Trigger Delay	1.00E-06	
External1 Trigger Delay State	FALSE	
External1 Trigger Level	1.2	
External1 Trigger Slope	Positive	
External2 Trigger Delay	1.00E-06	
External2 Trigger Delay State	FALSE	
External2 Trigger Level	1.2	
External2 Trigger Slope	Positive	
FilterAlpha	0.22	
Internal Preamp	FALSE	
Internal Preamp Band	Low	
Line Trigger Delay	1.00E-06	
Line Trigger Delay State	FALSE	
Line Trigger Slope	Positive	
Mechanical Atten	10	
Mechanical Atten Auto	TRUE	
OffsetDetecto	Peak	

r						
OffsetDetectorState	TRUE					
OffsetLimitAbsStartBTS	–14	–14	–26	–13	–13	–13
OffsetLimitAbsStartMS	–14	–14	–26	–13	–13	–13
OffsetLimitAbsStopBTS	–14	–26	–26	–13	–13	–13
OffsetLimitAbsStopMS	–14	–26	–26	–13	–13	–13
OffsetLimitFailMaskBTS	ABSolute	ABSolute	ABSolute	ABSolute	ABSolute	ABSolute
OffsetLimitFailMaskMS	ABSolute	ABSolute	ABSolute	ABSolute	ABSolute	ABSolute
OffsetLimitRelStartBTS	–30	–30	–30	–30	–30	–30
OffsetLimitRelStartMS	–30	–30	–30	–30	–30	–30
OffsetLimitRelStopBTS	–30	–30	–30	–30	–30	–30
OffsetLimitRelStopMS	–30	–30	–30	–30	–30	–30
OffsetMeasBWBTS	1	1	1	1	1	1
OffsetMeasBWMS	1	1	1	1	1	1
OffsetResolutionBWAutoBTS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
OffsetResolutionBWAutoMS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
OffsetResolutionBWBTS	30000	30000	30000	1000000	1000000	1000000
OffsetResolutionBWMS	30000	30000	30000	1000000	1000000	1000000
OffsetSideBTS	Both	Both	Both	Both	Both	Both
OffsetSideMS	Both	Both	Both	Both	Both	Both
OffsetStartFrequencyBTS	2515000	2715000	3515000	4000000	8000000	12500000

OffsetStartFrequencyMS	2515000	2715000	3515000	4000000	8000000	12500000
OffsetStateBTS	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE
OffsetStateMS	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE
OffsetStopFrequencyBTS	2715000	3515000	4000000	8000000	12500000	15000000
OffsetStopFrequencyMS	2715000	3515000	4000000	8000000	12500000	15000000
OffsetSweepTimeAutoBTS	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
OffsetSweepTimeAutoMS	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
OffsetSweepTimeBTS	0.017333	0.06932	0.042027	0.002053	0.002253	0.001253
OffsetSweepTimeMS	0.017333	0.06932	0.042027	0.002053	0.002253	0.001253
OffsetVbwRbwRatioAutoBTS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
OffsetVbwRbwRatioAutoMS	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
OffsetVbwRbwRatioBTS	0.01	0.01	0.01	0.01	0.01	0.01
OffsetVbwRbwRatioMS	0.01	0.01	0.01	0.01	0.01	0.01
OffsetVideoBWAutoBTS	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
OffsetVideoBWAutoMS	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
OffsetVideoBWBTS	300	300	300	10000	10000	10000
OffsetVideoBWMS	300	300	300	10000	10000	10000
PeakReference	−82.9957					

Periodic Timer Period	0.02
Periodic Timer Sync Source	None
Periodic Timer Trigger Delay	1.00 E–06
Periodic Timer Trigger Delay State	FALSE
PowerReference	–73.6966
PSDReference	–139.54
Radio Device	Bts
RFBurst Trigger Delay	1.00 E–06
RFBurst Trigger Delay State	FALSE
RFBurst Trigger Level Abs	–20
RFBurst Trigger Level Rel	–6
RFBurst Trigger Level Type	Absolute
RFBurst Trigger Slope	Positive
RrcFilter	FALSE
SemAverageNumber	10
SemAverageState	FALSE
TotalAtten	10
Trigger Holdoff	0.1
Trigger	FALS

Holdoff State	E										
TriggerSource	Free										
Video Trigger Delay	1.00 E-06										
Video Trigger Delay State	FALSE										
Video Trigger Level	-25										
Video Trigger Slope	Positive										
Video Selection	AbsPwrFreq										
MeasResult1	MeasResult2	MeasResult3	MeasResult4	MeasResult5	MeasResult6	MeasResult7	MeasResult8	MeasResult9	MeasResult10	MeasResult11	MeasResult12
-999	-78.89359	-13	999	-73.696633409987 9	-999	-999	-999	-999	-999	-999	-999
-73.6966334099879	-78.95235	-13	999	-999	-999	-999	-999	-999	-999	-999	

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

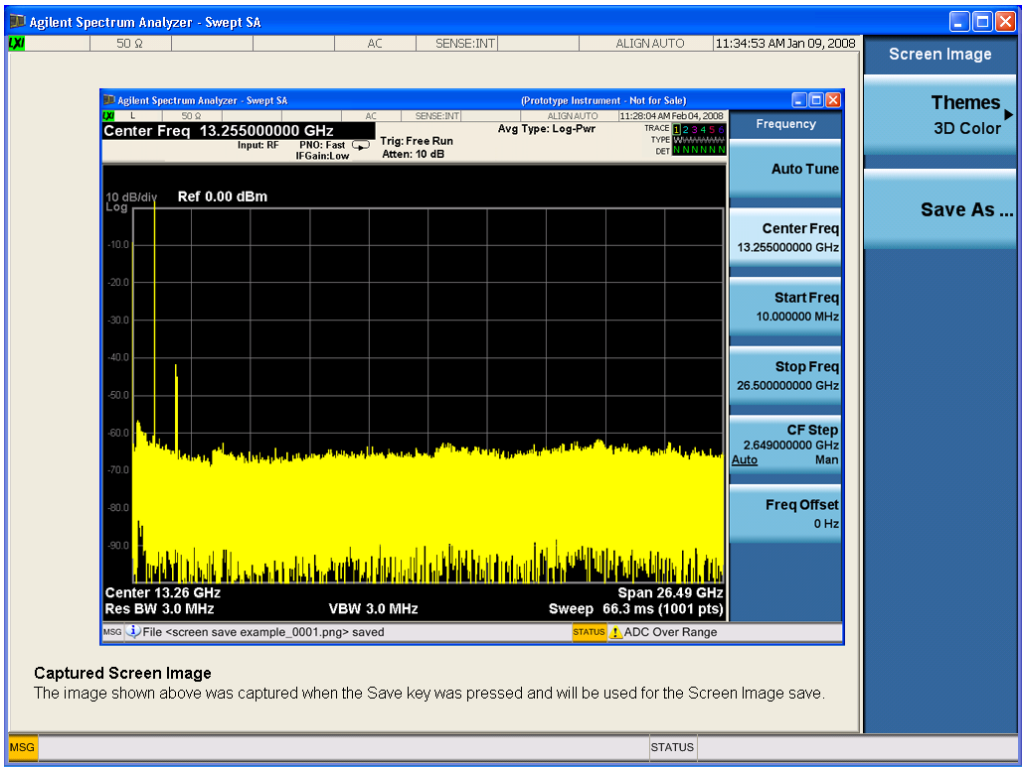
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 1356

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 1359 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	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. 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. 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. 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.
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 the "RF Power Range " on page 1359 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 1359 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 1363, "W-CDMA Channel Number Ranges" on page 1364, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1366, and "LTE FDD Channel Number Ranges" on page 1368.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719	0.025×N+ 806.000
		720 ≤ N ≤ 919	0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719	0.025×N+ 851.000
		720 ≤ N ≤ 919	0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
	Uplink (MS, reverse link)	1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
	Uplink (MS, reverse link)		
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
	Downlink (BS, forward link)	1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
	Downlink (BS, forward link)		

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

$Nt = 5*F\ 0.0\ MHz \leq F \leq 3276.6\ MHz$

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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 2010–2025 MHz	9504 to 9596 10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz 1930–1990 MHz	9254 to 9546 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 “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 2009 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source

Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`

Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns :SOUR:RAD:ARB:TRIG:EXT:DEL? :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms OFF
Min	0 s
Max	8.589934588 s (Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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	A.11.00

Ref Value

Sets the X reference value.

Key Path	SPAN X Scale
Mode	BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVDO, 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

Scale/Div

Sets the horizontal scale.

Key Path	SPAN X Scale
Mode	BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVDO, 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

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, 1XEVDO, 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

Auto Scaling

Toggles the scale coupling function between On and Off.

Key Path	SPAN X Scale
Mode	BASIC, PNOISE, WCDMA, C2K, GSM, WIMAXOFDMA, TDSCDMA, 1XEVDO, 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

Sweep/Control

Displays a menu that enables you to set up and control the sweep time, gate method, and source of the current measurement. See Sweep/Control for more information.

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

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 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.

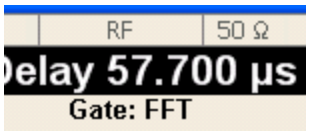
Key Path	Sweep/Control
Scope	Meas Global
Readback	The state and method of Gate, as [Off, FFT] or [On, FFT]. Note that for measurements that only support gated FFT, the method is nonetheless read back, but always as FFT.
Initial S/W Revision	Prior to A.02.00

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: • 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

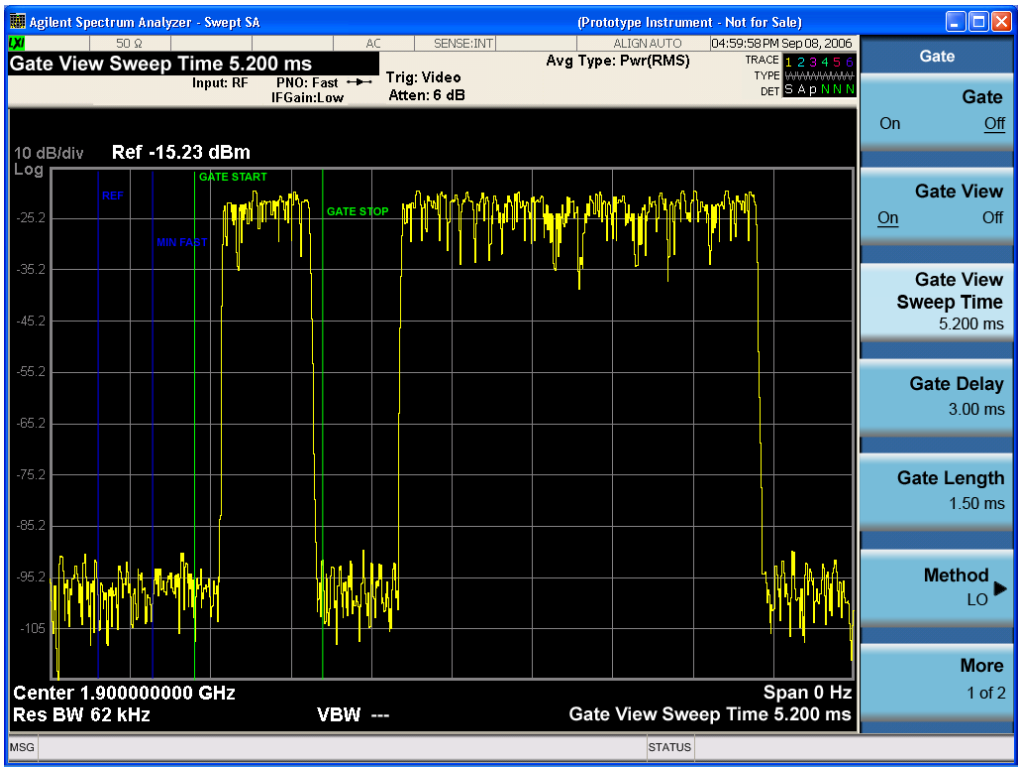
Turning on Gate View in the Swept SA measurement provides a single-window gate view display..

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.

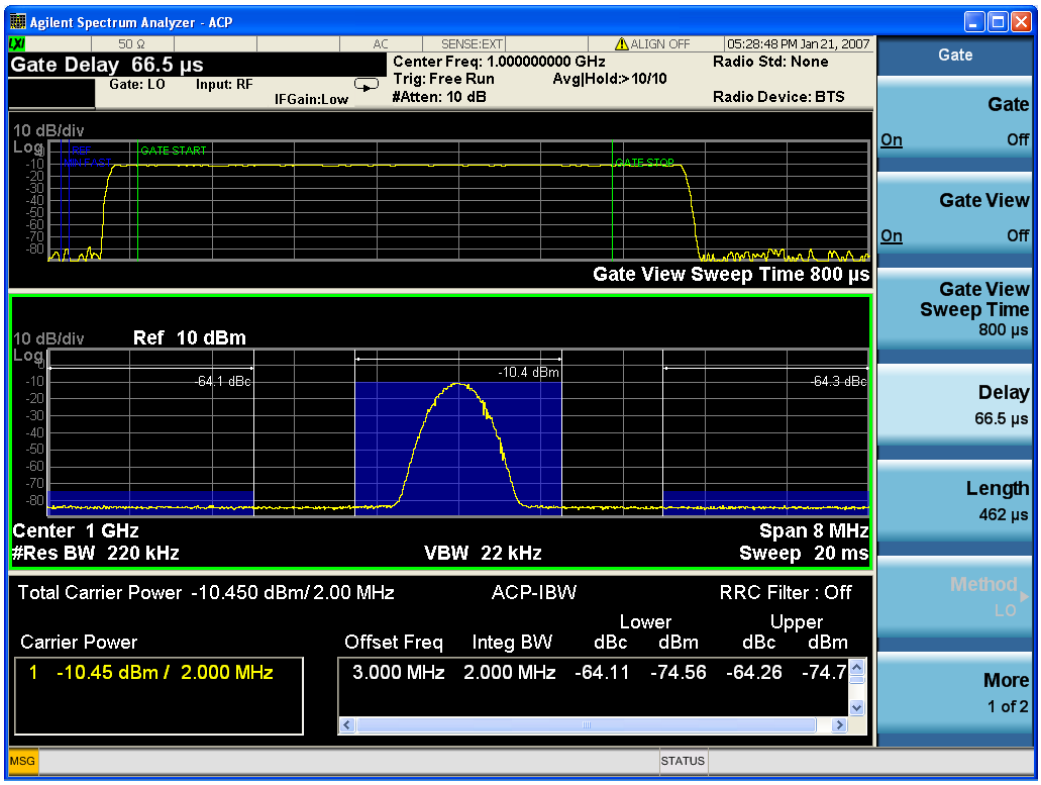
Key Path	Sweep/Control, Gate
Remote Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.

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: • 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 1468 • 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: • On Preset (after initializing delay and length). • Every time the Gate Method is set/changed. 1. Compute the location of the "gate stop" line, which you know is at time t = tmin + GateDelay +

	GateLength.
Preset	519.3 µs 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	–3.5V
Max	3.5V
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	–3.5V
Max	3.5V
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.

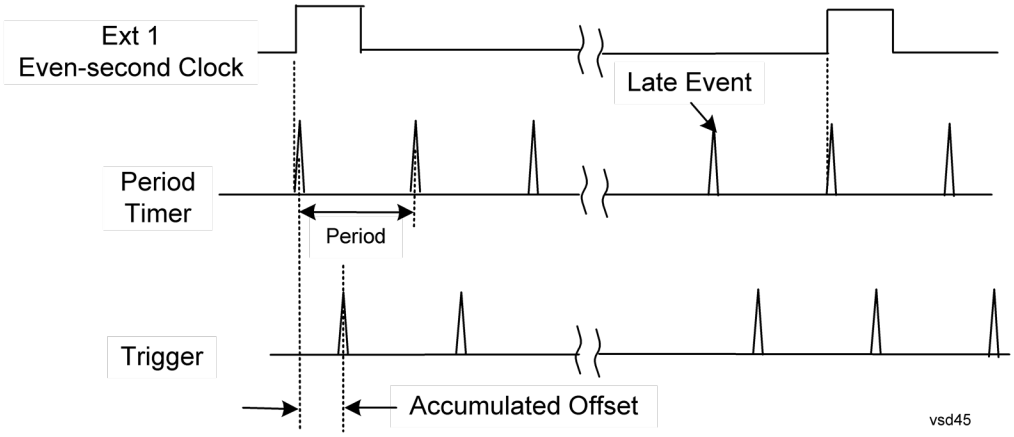
A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source

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	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 321.

	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 321 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	–3.5V
Max	3.5V
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	–3.5V
Max	

	3.5V
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: • 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 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	`[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel <voltage>` `[:SENSe]:SWEep:EGATe:EXTernal[1]|2:LEVel?`
Notes	This command is simply an alias to :TRIGger[:SEQuence]:EXTernal[1]|2:LEVel 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	`[:SENSe]:SWEep:EGATe:POLarity NEGative|POSitive` `[:SENSe]:SWEep:EGATe:POLarity?`
Example	SWE:EGAT:POL NEG SWE:EGAT:POL?
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	[:SENSe]:SWEep:TIME:GATE:POLarity 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

System

See "System" on page 230

Trace/Detector

Accesses a menu of functions that enable you to control trace and detector 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 for the current measurement. The menu contains a 1–of–N selection of the trace type (Clear Write, Average, Max Hold, Min Hold).

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

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.

Key Path	Trace/Detector
Initial S/W Revision	Prior to A.02.00

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.

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

Chan Detector Selection

Selects the detector mode for the reference channel.

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

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.

Key Path	Trace/Detector
Initial S/W Revision	Prior to A.02.00

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.

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

Offset Detector Selection

Selects the detector mode for the offsets.

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

Trigger

See "Trigger" on page 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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.
- Carrier Info –displays the carrier configuration information with measure powers. (Only available in MSR and LTE-Advanced FDD/TDD)

"View Selection by Name (Remote Command Only)" on page 1506

"Views Selection by Number (Remote Command only)" on page 1507

View Selection by Name (Remote Command Only)

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.
Dependencies	In the SA mode, when "Radio Standard" is set to WLAN, IPOWer is not available and the key is grayed out. CINFormation is available only in MSR and LTE-Advanced FDD/TDD mode, otherwise the key is blank.
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

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. displays the carrier info table. (Only available in MSR and LTE-Advanced FDD/TDD)

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	In the SA mode, when "Radio Standard" is set to WLAN, Option 3 is not available. Option 4 is available only in MSR and LTE-Advanced FDD/TDD mode. 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

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

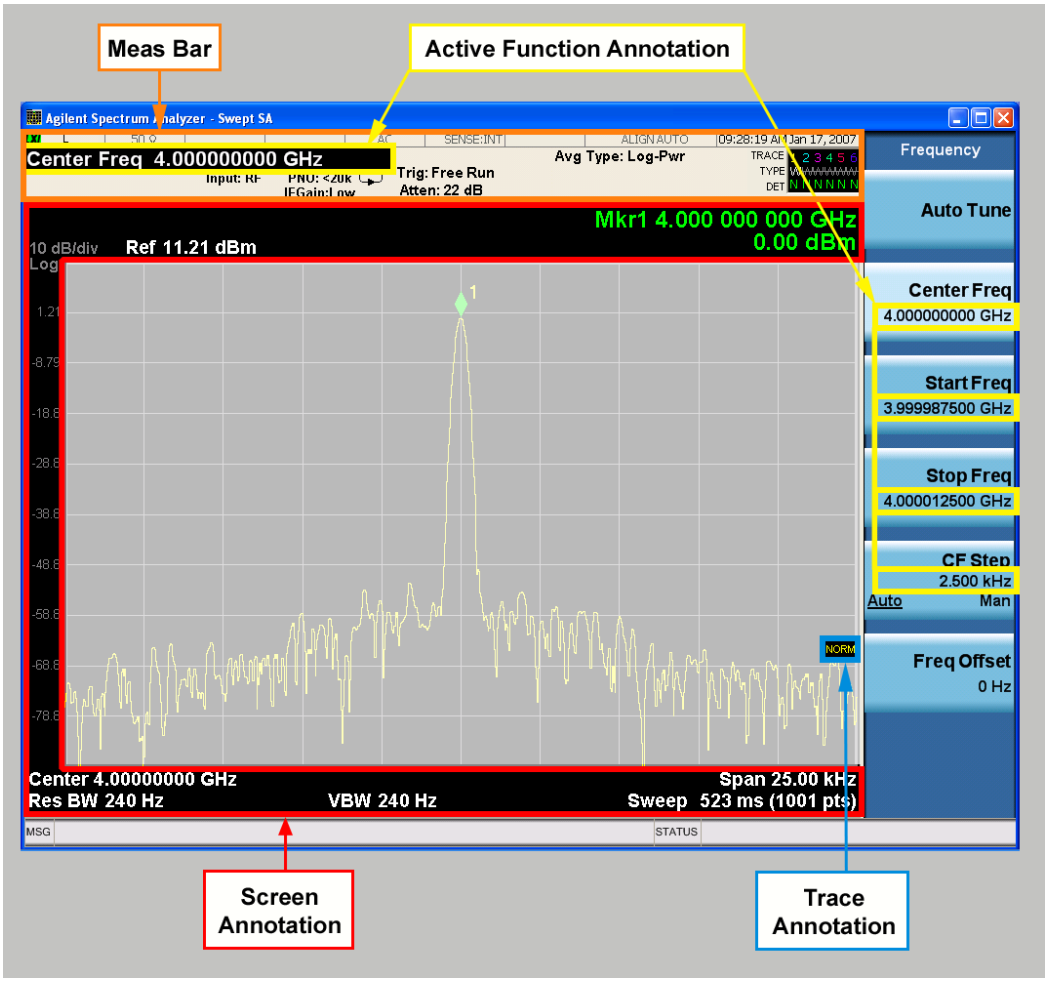
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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

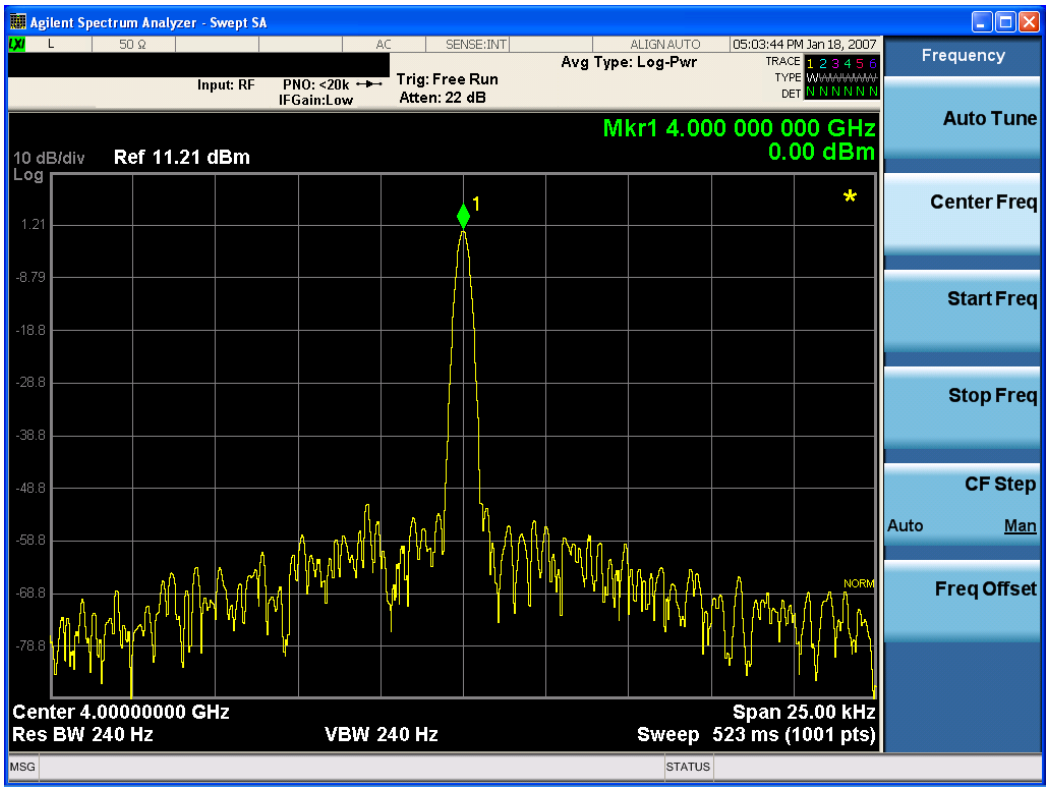
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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 1515

"Abs Peak Pwr & Freq (PSD Ref)" on page 1517

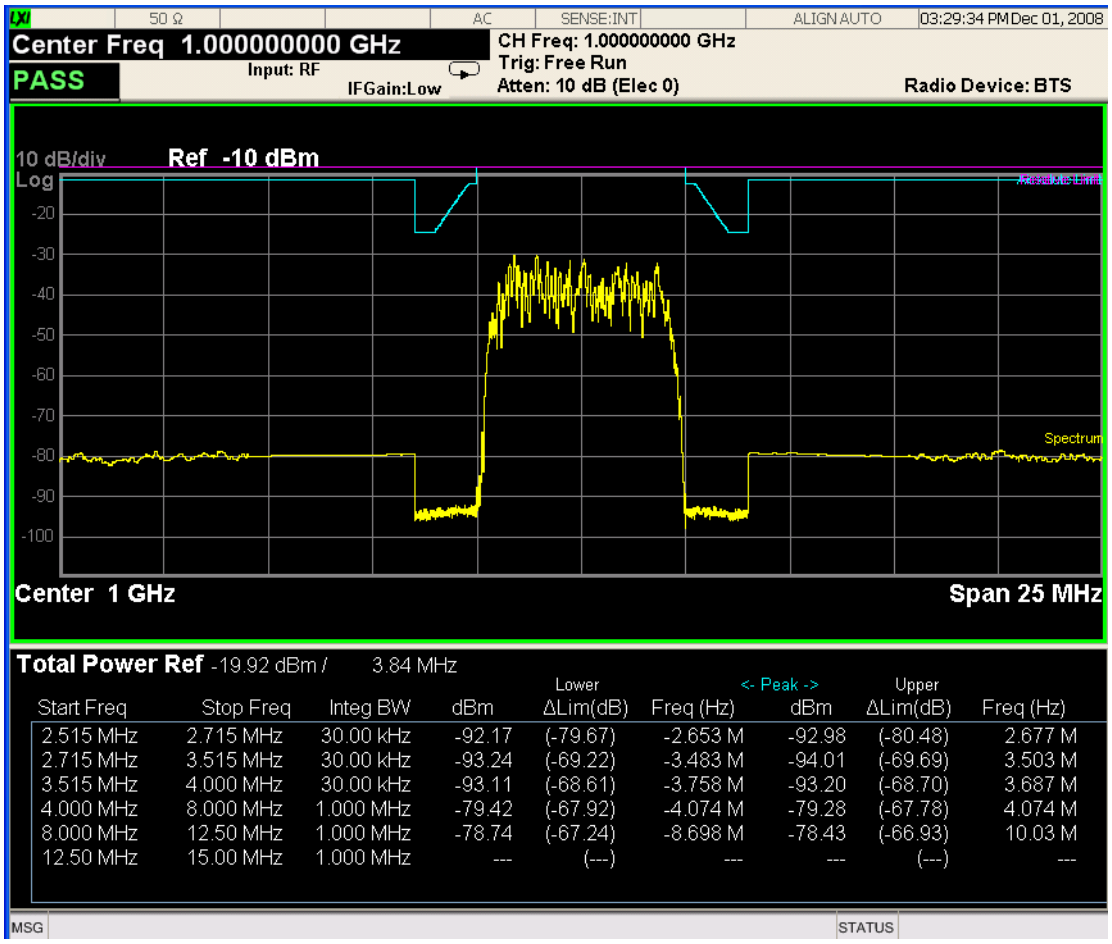
"Abs Peak Pwr & Freq (Spectrum Pk Ref)" on page 1519

Abs Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

"Trace Window" on page 1517

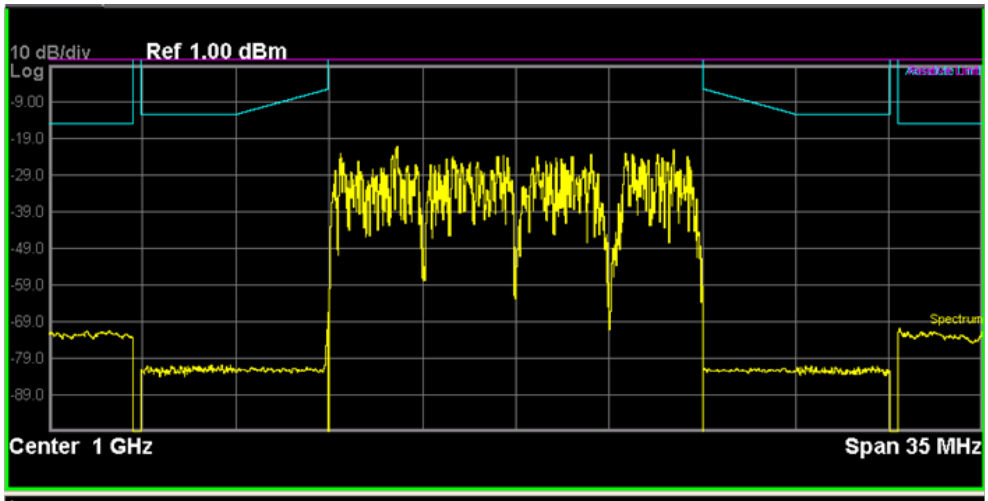
"Results Window " on page 1517



Total Power Ref -19.92 dBm / 3.84 MHz

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
2.515 MHz	2.715 MHz	30.00 kHz	-92.17	(-79.67)	-2.653 M	-92.98	(-80.48)	2.677 M
2.715 MHz	3.515 MHz	30.00 kHz	-93.24	(-69.22)	-3.483 M	-94.01	(-69.69)	3.503 M
3.515 MHz	4.000 MHz	30.00 kHz	-93.11	(-68.61)	-3.758 M	-93.20	(-68.70)	3.687 M
4.000 MHz	8.000 MHz	1.000 MHz	-79.42	(-67.92)	-4.074 M	-79.28	(-67.78)	4.074 M
8.000 MHz	12.50 MHz	1.000 MHz	-78.74	(-67.24)	-8.698 M	-78.43	(-66.93)	10.03 M
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

MSG
STATUS



Ref Carrier Power -11.23 dBm / 4.15 MHz (Carrier#1: Left)
-12.87 dBm / 3.84 MHz (Carrier#4:Right)

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
50.00 kHz	5.050 MHz	102.0 kHz	-66.45	(-60.95)	-50.00 k	-82.41	(-69.95)	5.025 M
5.050 MHz	10.05 MHz	100.0 kHz	-80.72	(-68.22)	-5.750 M	-81.06	(-68.56)	9.375 M
10.50 MHz	15.00 MHz	1.000 MHz	-71.56	(-56.56)	-11.78 M	-70.97	(-55.97)	10.55 M
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
40.00 MHz	50.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

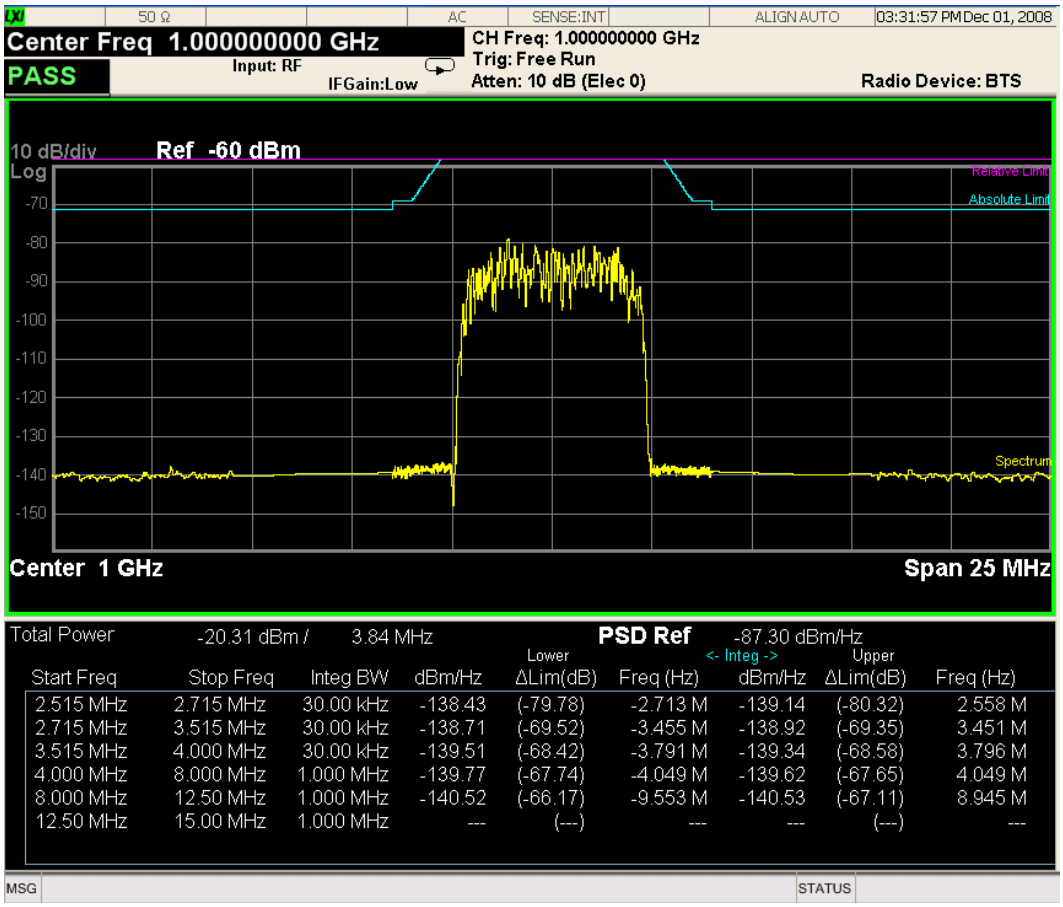
Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower Peak (dBm)	Absolute peak power on minimum margin 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 1519

"Results Window " on page 1519

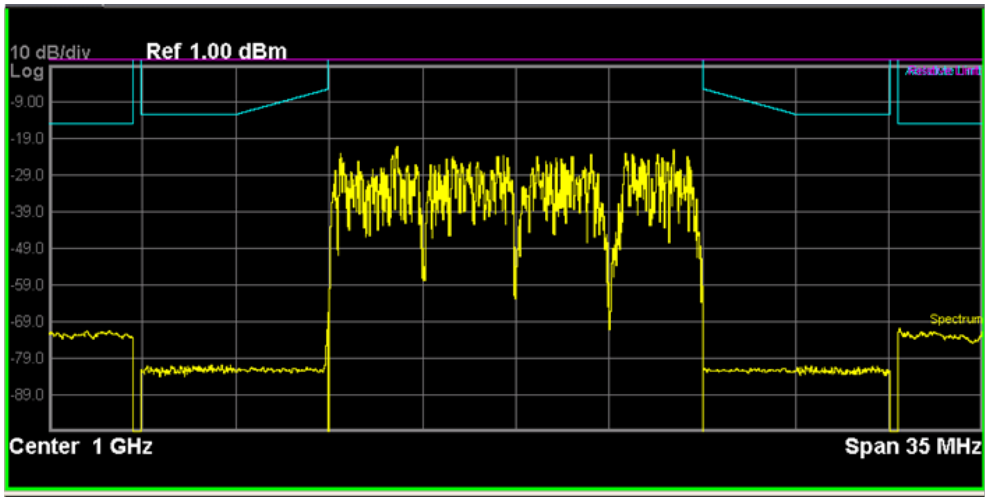


Total Power -20.31 dBm / 3.84 MHz

PSD Ref -87.30 dBm/Hz

Start Freq	Stop Freq	Integ BW	dBm/Hz	Lower ΔLim(dB)	Lower Freq (Hz)	<- Integ -> dBm/Hz	Upper ΔLim(dB)	Upper Freq (Hz)
2.515 MHz	2.715 MHz	30.00 kHz	-138.43	(-79.78)	-2.713 M	-139.14	(-80.32)	2.558 M
2.715 MHz	3.515 MHz	30.00 kHz	-138.71	(-69.52)	-3.455 M	-138.92	(-69.35)	3.451 M
3.515 MHz	4.000 MHz	30.00 kHz	-139.51	(-68.42)	-3.791 M	-139.34	(-68.58)	3.796 M
4.000 MHz	8.000 MHz	1.000 MHz	-139.77	(-67.74)	-4.049 M	-139.62	(-67.65)	4.049 M
8.000 MHz	12.50 MHz	1.000 MHz	-140.52	(-66.17)	-9.553 M	-140.53	(-67.11)	8.945 M
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

MSG STATUS



Ref Carrier Power -11.23 dBm / 4.15 MHz (Carrier #1: Left)
-12.87 dBm / 3.84 MHz (Carrier #4: Right)

PSD Ref -77.41 dBm/Hz
-78.71 dBm/Hz

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
50.00 kHz	5.050 MHz	102.0 kHz	-66.45	(-60.95)	-50.00 k	-82.41	(-69.95)	5.025 M
5.050 MHz	10.05 MHz	100.0 kHz	-80.72	(-68.22)	-5.750 M	-81.06	(-68.56)	9.375 M
10.50 MHz	15.00 MHz	1.000 MHz	-71.56	(-56.56)	-11.78 M	-70.97	(-55.97)	10.55 M
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
40.00 MHz	50.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

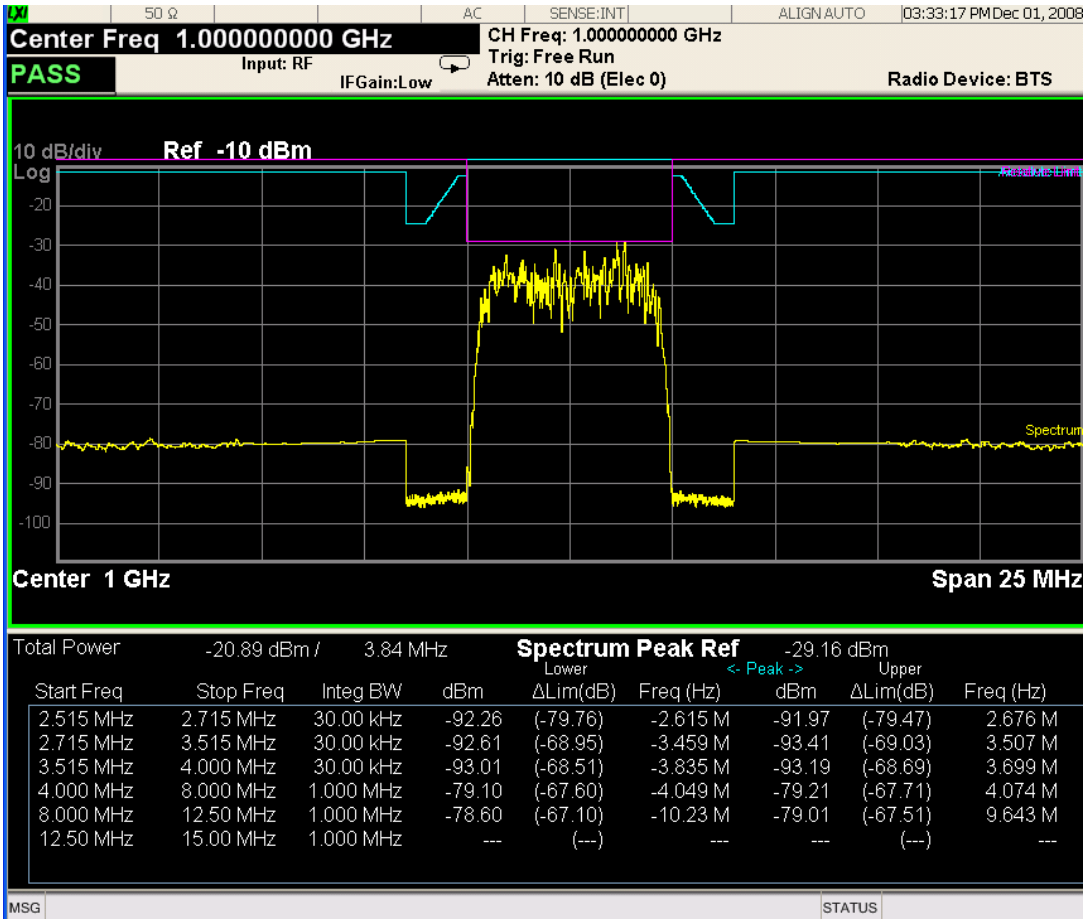
Name	Corresponding Results
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dBm/Hz)	Absolute power spectrum density of the negative offset
Lower 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 (dBm/Hz)	Absolute 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 Freq (Hz)	Frequency on minimum margin point of the positive offset

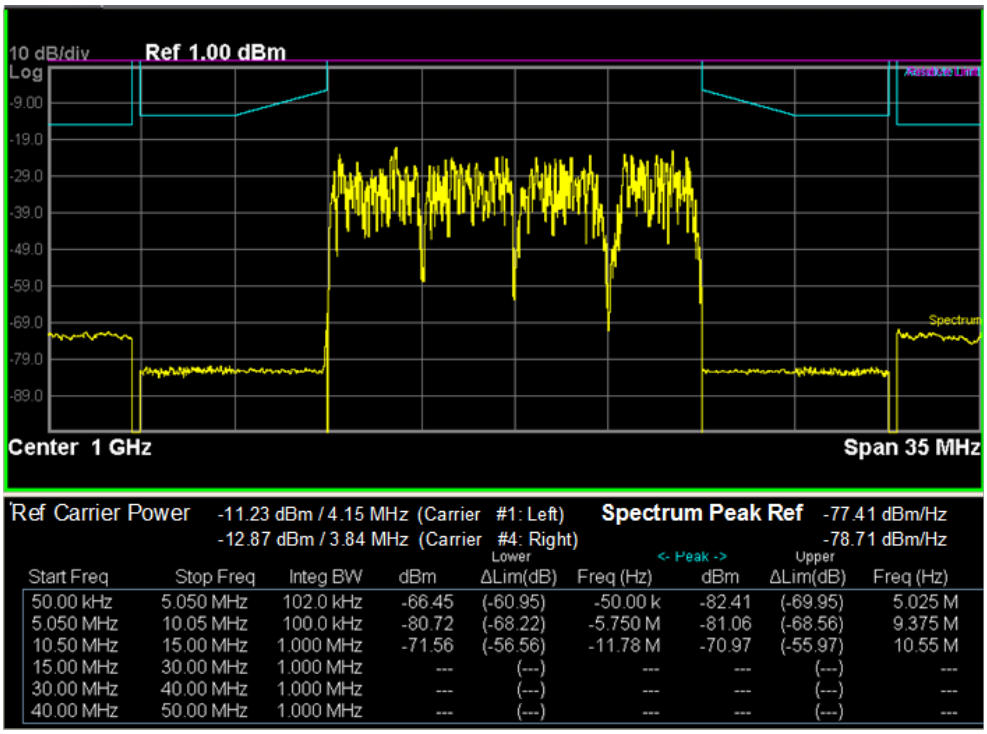
Abs Peak Pwr & Freq (Spectrum Pk Ref)

This view consists of the following two windows:

"Trace Window" on page 1519

"Results Window " on page 1519


50 Ω
AC
SENSE:INT
ALIGN AUTO
03:33:17 PM Dec 01, 2008
Center Freq 1.000000000 GHz
PASS
Input: RF
IFGain:Low
CH Freq: 1.000000000 GHz
Trig: Free Run
Atten: 10 dB (Elec 0)
Radio Device: BTS
10 dB/div
Log
Ref -10 dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100
Spectrum
Center 1 GHz
Span 25 MHz
Total Power -20.89 dBm / 3.84 MHz
Spectrum Peak Ref -29.16 dBm
Lower
<- Peak ->
Upper
Start Freq | Stop Freq | Integ BW | dBm | ΔLim(dB) | Freq (Hz) | dBm | ΔLim(dB) | Freq (Hz)
2.515 MHz | 2.715 MHz | 30.00 kHz | -92.26 | (-79.76) | -2.615 M | -91.97 | (-79.47) | 2.676 M
2.715 MHz | 3.515 MHz | 30.00 kHz | -92.61 | (-68.95) | -3.459 M | -93.41 | (-69.03) | 3.507 M
3.515 MHz | 4.000 MHz | 30.00 kHz | -93.01 | (-68.51) | -3.835 M | -93.19 | (-68.69) | 3.699 M
4.000 MHz | 8.000 MHz | 1.000 MHz | -79.10 | (-67.60) | -4.049 M | -79.21 | (-67.71) | 4.074 M
8.000 MHz | 12.50 MHz | 1.000 MHz | -78.60 | (-67.10) | -10.23 M | -79.01 | (-67.51) | 9.643 M
12.50 MHz | 15.00 MHz | 1.000 MHz | --- | (---) | --- | --- | (---) | ---
MSG
STATUS


10 dB/div
Log
Ref 1.00 dBm
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
-79.0
-89.0
Spectrum
Center 1 GHz
Span 35 MHz
Ref Carrier Power -11.23 dBm / 4.15 MHz (Carrier #1: Left)
-12.87 dBm / 3.84 MHz (Carrier #4: Right)
Spectrum Peak Ref -77.41 dBm/Hz
-78.71 dBm/Hz
Lower
<- Peak ->
Upper
Start Freq | Stop Freq | Integ BW | dBm | ΔLim(dB) | Freq (Hz) | dBm | ΔLim(dB) | Freq (Hz)
50.00 kHz | 5.050 MHz | 102.0 kHz | -66.45 | (-60.95) | -50.00 k | -82.41 | (-69.95) | 5.025 M
5.050 MHz | 10.05 MHz | 100.0 kHz | -80.72 | (-68.22) | -5.750 M | -81.06 | (-68.56) | 9.375 M
10.50 MHz | 15.00 MHz | 1.000 MHz | -71.56 | (-56.56) | -11.78 M | -70.97 | (-55.97) | 10.55 M
15.00 MHz | 30.00 MHz | 1.000 MHz | --- | (---) | --- | --- | (---) | ---
30.00 MHz | 40.00 MHz | 1.000 MHz | --- | (---) | --- | --- | (---) | ---
40.00 MHz | 50.00 MHz | 1.000 MHz | --- | (---) | --- | --- | (---) | ---

Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

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 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 (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

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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 1521

"Rel Peak Pwr & Freq (PSD Ref)" on page 1523

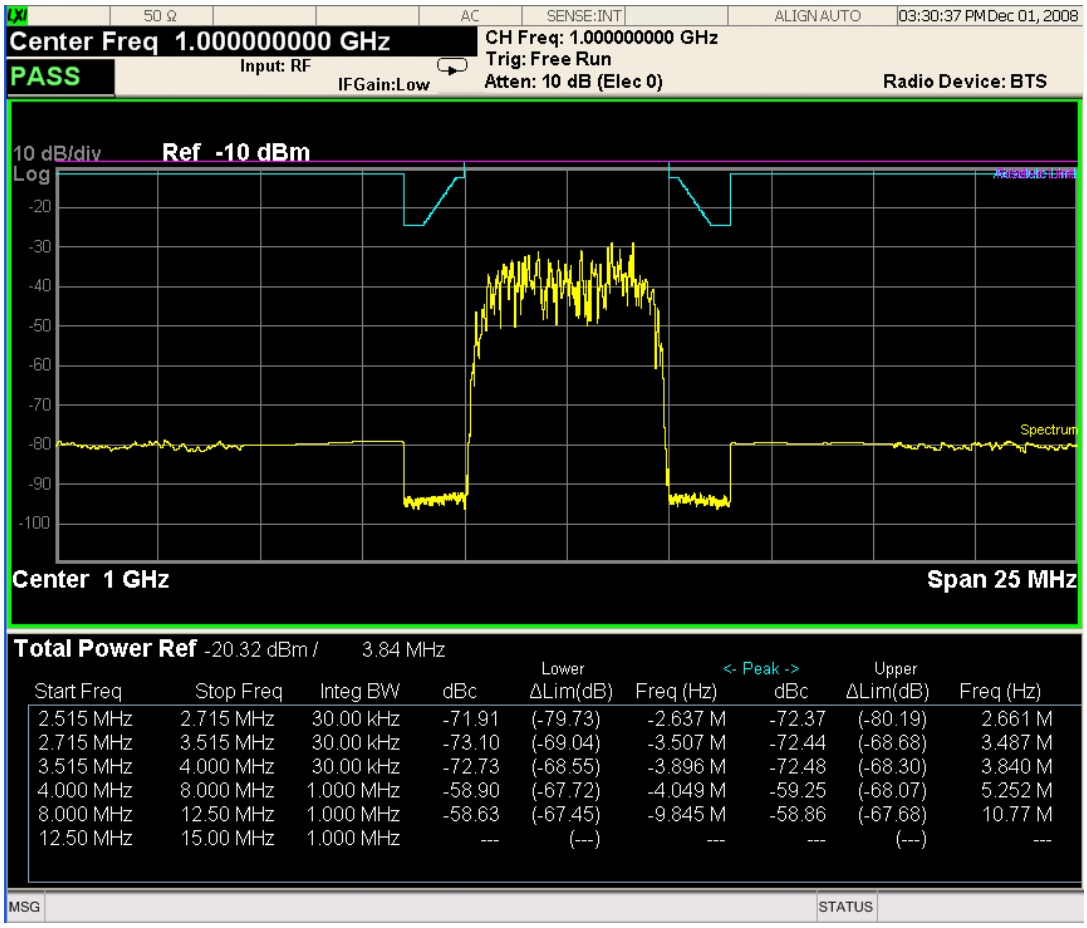
"Rel Peak Pwr & Freq (Spectrum Pk Ref)" on page 1524

Rel Peak Pwr & Freq (Total Pwr Ref)

This view consists of the following two windows:

"Trace Window" on page 1522

"Results Window" on page 1522



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

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 (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

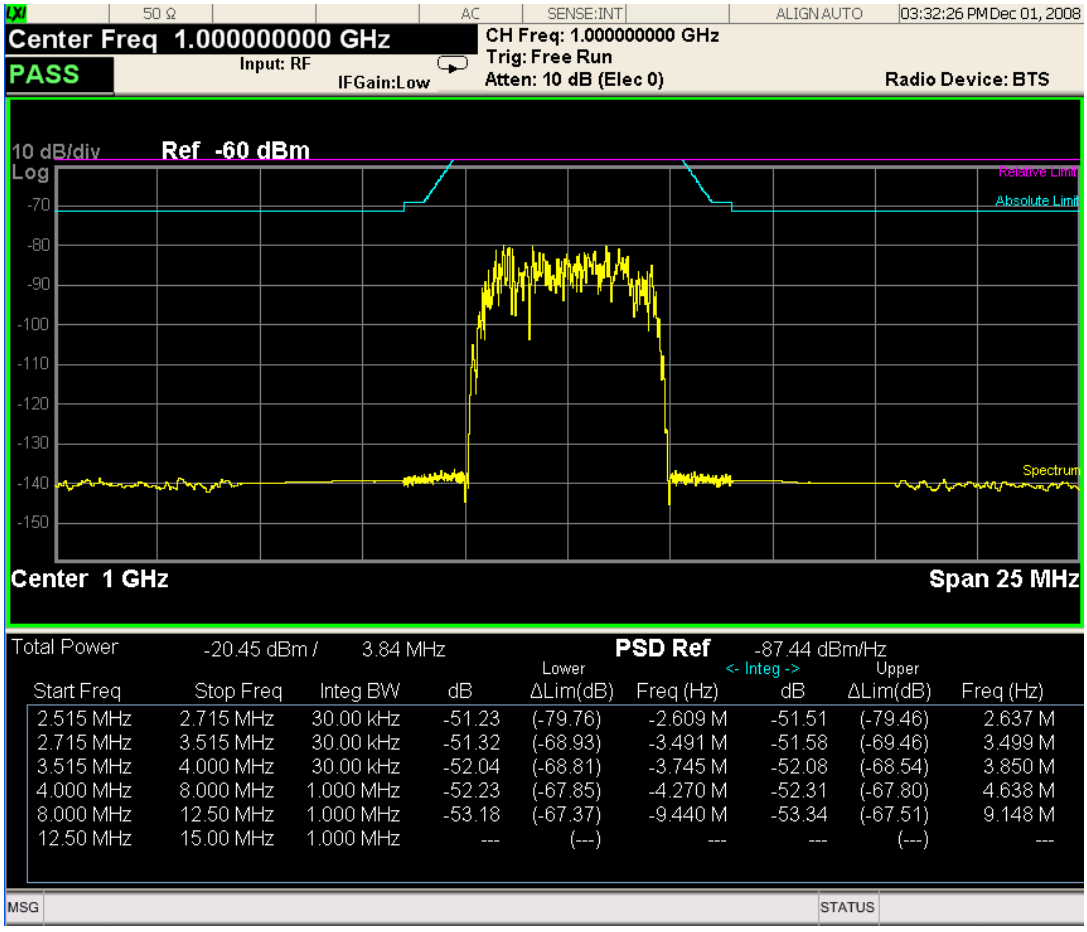
Name	Corresponding Results
Lower Freq (Hz)	Frequency on minimum margin point of the negative offset
Upper Peak (dBc)	Relative peak power on minimum margin point of the positive offset
Upper ΔLim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq (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 1523

"Results Window" on page 1524



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

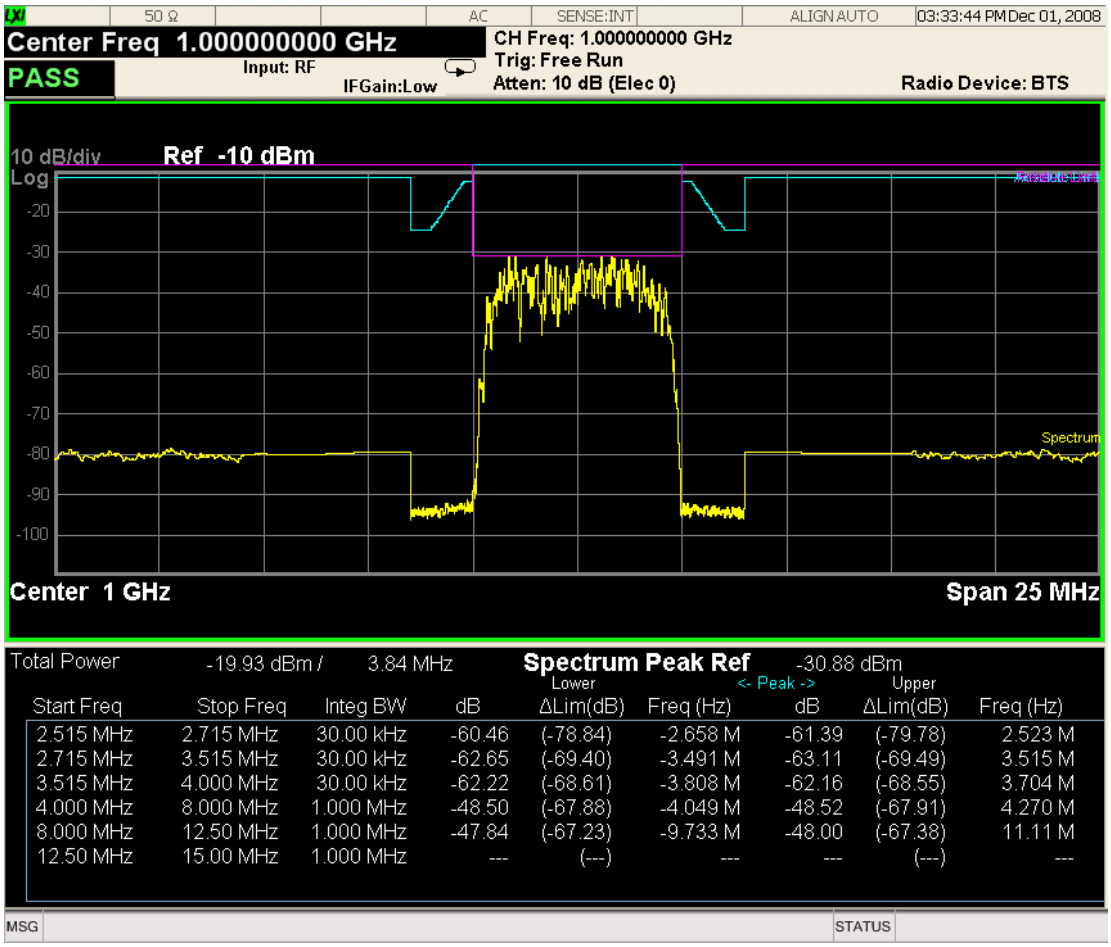
Name	Corresponding Results
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dB)	Relative power spectrum density of the negative offset
Lower 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 (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 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 1522

"Results Window" on page 1522



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

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 ΔLim (dB)	Minimum margin from limit line which is decided by Fail Mask setting

Name	Corresponding Results
	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 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

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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 1526

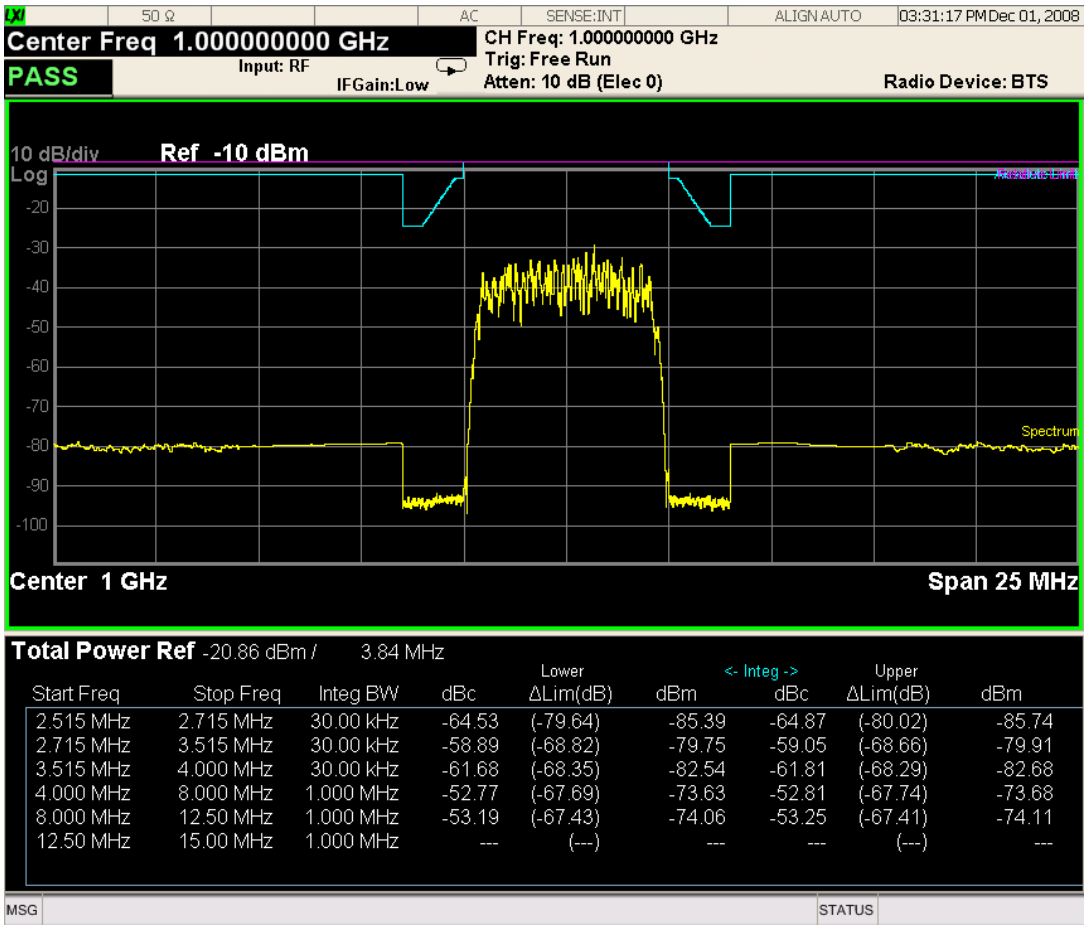
"Integrated Power (PSD Ref)" on page 1529

"Integrated Power (Spectrum Pk Ref)" on page 1532

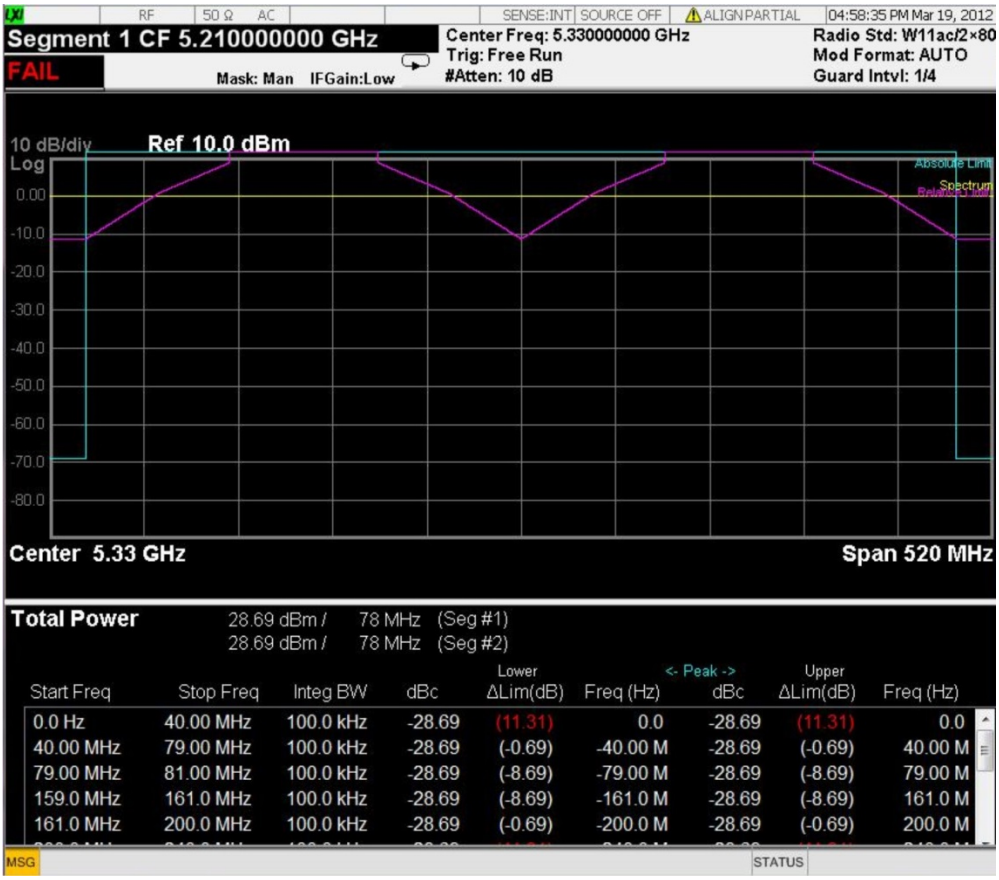
Integrated Power (Total Pwr Ref)

"Trace Window" on page 1528

"Results Window" on page 1528



For WLAN 802.11ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

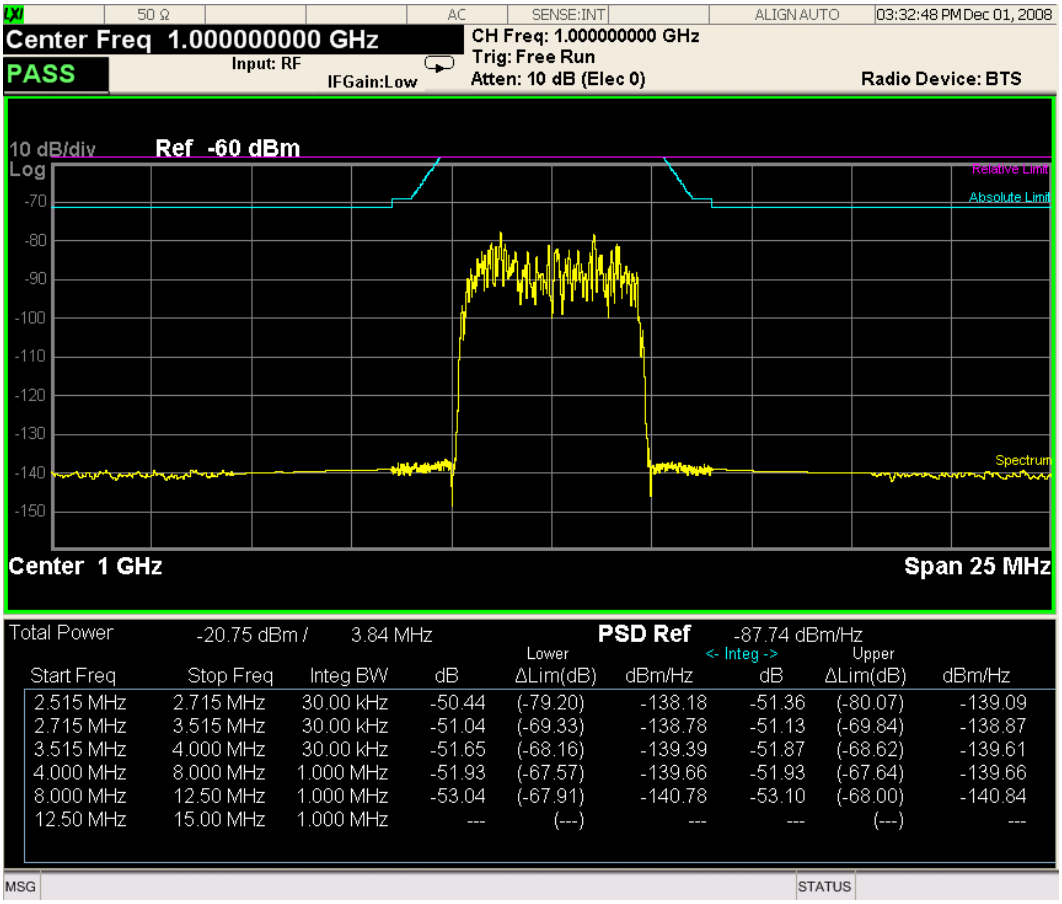
Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower Integ (dBc)	Relative integrated power on the negative 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

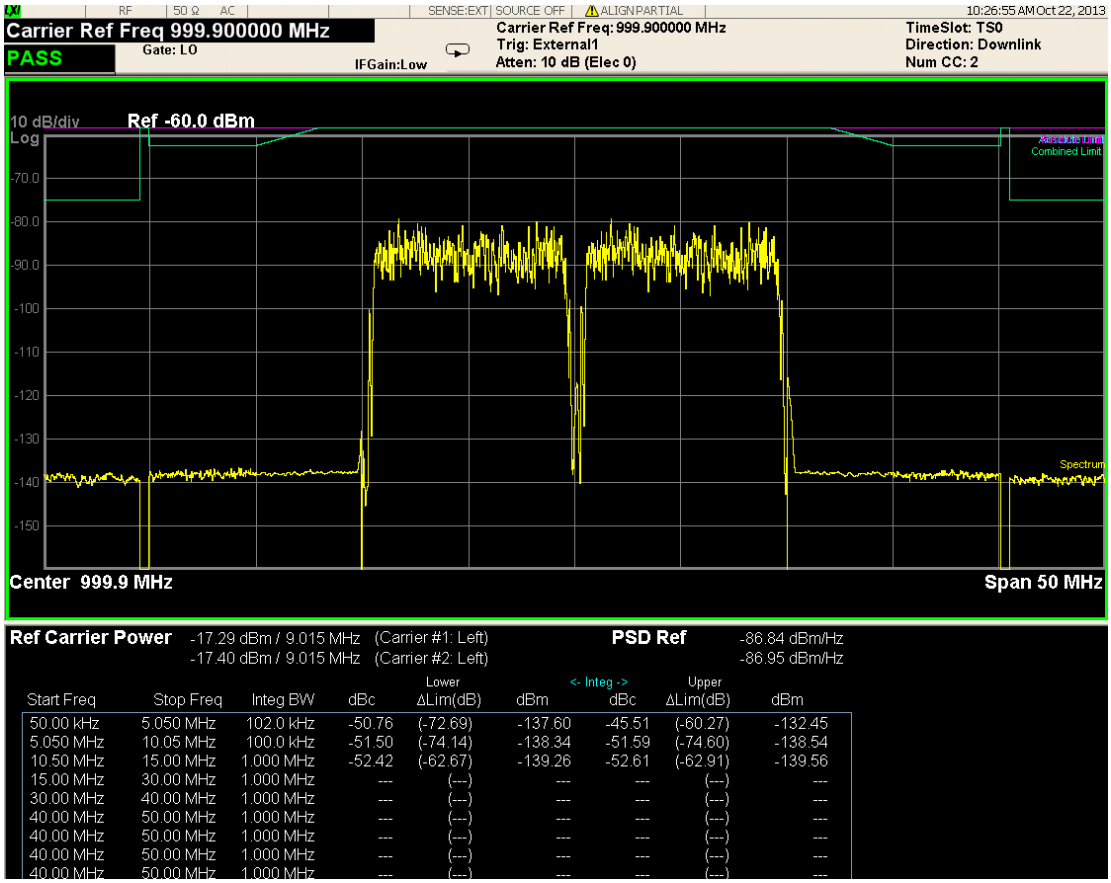
Name	Corresponding Results
Upper Integ (dBc)	Relative integrated power on the positive offset
Upper ΔLim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Integ (dBm)	Absolute integrated power on the positive offset

Integrated Power (PSD Ref)

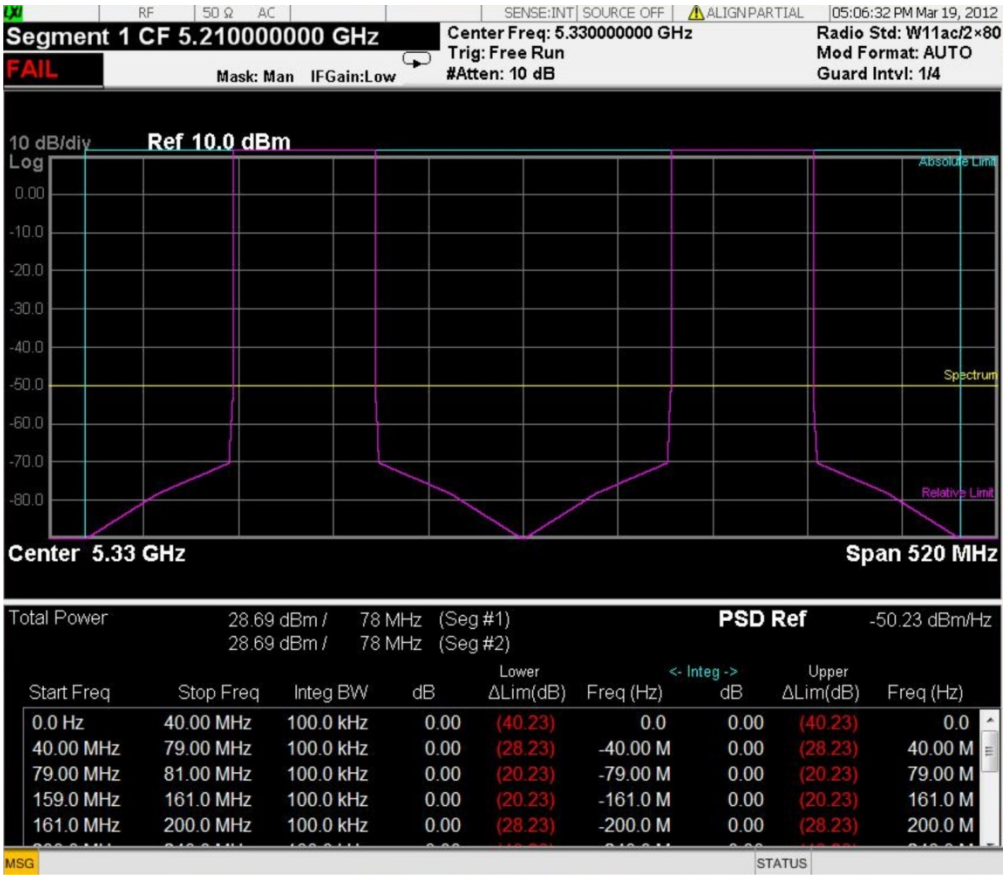
"Trace Window" on page 1531

"Results Window" on page 1531





For WLAN 802.11ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

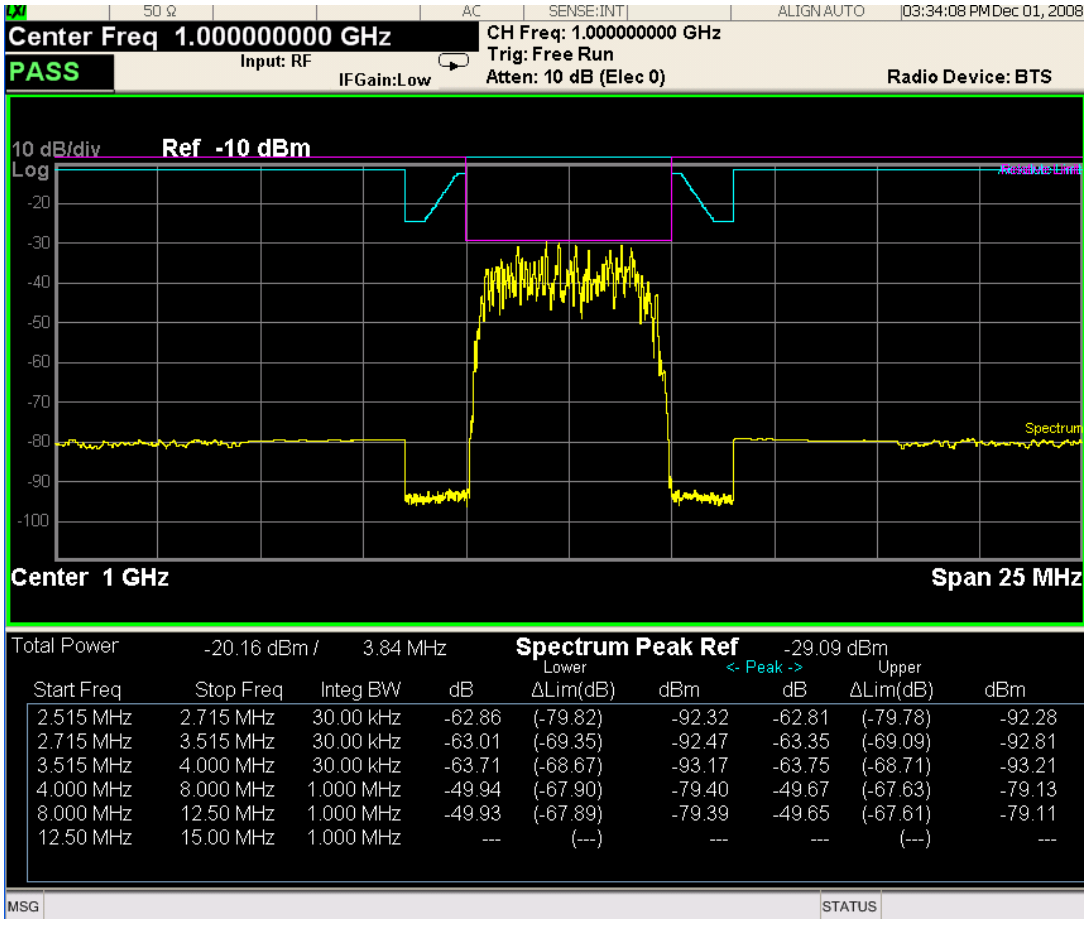
Name	Corresponding Results
Total Pwr	n=1 2nd element Absolute power at the reference area.
	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start (Hz)	Start frequency for offset
Stop (Hz)	Stop frequency for offset
Meas BW (Hz)	Measurement bandwidth for offset
Lower (dB)	Relative power spectrum density of the negative offset
Lower ΔLim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset

Name	Corresponding Results
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 1528

"Results Window" on page 1528



For WLAN 802.11ac (80 + 80 MHz), power readouts of both of the carriers are displayed in the lower result window.

Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

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 Δlim (dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset

Name	Corresponding Results
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 Δlim (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

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

Limit Lines

Toggles the limit lines display function for the spectrum emission mask measurements On and Off.

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

12 Reverse Link Code Domain Measurement

This measures the Code Domain of 1xEV-DO signal.

This topic contains the following sections:

For more information, see "More Information" on page 1543.

Measurement Commands for Reverse Link Code Domain Measurement

You must be in the 1xEV-DO mode to use these commands. Use INSTtument:SELect to set the mode.

NOTE The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:TCDPower commands for more measurement related commands.

Remote SCPI	Backwards Compatibility SCPI:
:CONFigure:CDPower:MS	:CONFigure:TCDPower
:CONFigure:CDPower:MS:NDEFault	:CONFigure:TCDPower
:INITiate:CDPower:MS	:INITiate:TCDPower
:FETCh:CDPower:MS[n]?	:FETCh:TCDPower[n]?
:READ:CDPower:MS[n]?	:READ:TCDPower[n]?
:MEASure:CDPower:MS[n]?	:MEASure:TCDPower[n]?

For more measurement related commands, see the section "Remote Measurement Functions" on page 1866.

Remote Command Results for Reverse Link Code Domain Measurement

Index n	Result 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	Returns following 22 comma-separated scalar results, in the following order: RMS Symbol EVM – a floating point number (in percent) of EVM over the entire measurement area. Peak Symbol EVM error – a floating point number (in percent) of peak EVM in the measurement area. Symbol Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. Symbol Phase error – a floating point number (in degree) of average phase error over the entire measurement area. Total Power – a floating point number (in dBm) of total RF power for the period selected by Meas Offset and Meas Interval. Following 6th, 7th, 8th, 15th to 20th results are computed in CDP computation. The unit indicated as (dBm/dB) is dBm or dB depend on the selection of :CALCulate:TCDPower:TYPE. When it's Relative, the power is relative to Total Power. Average Power – a floating point number (in dBm/dB) of entire slot for the selected code averaged over the meas interval. Total Active Power – a floating point number (in dBm/dB) of sum of active power. Pilot power – a floating point number (in dBm/dB) of average power of Pilot code. Total Power for a half slot – a floating point number (in dBm) of total RF power at the selected Meas Offset. It's the average over a half slot length. (Reserved) – (always NaN.) (Reserved) – (always NaN.) (Reserved) – (always NaN.) (Reserved) – (always NaN.) Number of Active Channel – It is an integer number of number of active channels at the selected Meas Offset for a half slot. I channel Average Active Power – floating number (in dBm/dB) I channel Max Inactive Power – floating number (in dBm/dB) Q channel Average Active Power – floating number (in dBm/dB) Q channel Max Inactive Power – floating number (in dBm/dB) (Reserved) – (always NaN.) Channel CDE – floating number (in dB/dBm) The absolute or relative (relative to Total Power) CDE in the entire slot, for the selected code, averaged over a half slot from Meas Offset. First Slot Number - It is a floating point number of first slot in Capture Interval. Modulation Scheme – It is an integer number to represent the modulation scheme for the specified channel and measurement time period. The meaning of the number is : 0 = BPSK 1 = QPSK 2 = 8PSK

2	Returns series of floating point numbers (in dB or dBm depend on the measurement type) that represent all code domain powers. When I/Q Combined Power Bar is set to ON, total is 16 for Subtype 0/1, 32 for Subtype 2. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2) the power is duplicated. 1st number = 1st code power over the slot 2nd number = 2nd code power over the slot . . . Nth number = Nth code power over the slot When I/Q combined Power Bar is set to OFF, code domain power results are returned alternatively. Total is 16 IQ pairs for Subtype 0/1, 32 IQ pairs for Subtype 2. If the active channel occupies more than max spreading factor (16 for Subtype 0/1, 32 for Subtype 2), the power is duplicated. 1st number = 1st In Phase code power over the slot. 2nd number = 1st Quad Phase code power over the slot. ... (2*N–1)th number = Nth In Phase code power over the slot (2*N)th number = Nth Quad Phase code power over the slot N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
3	Returns series of floating point numbers (in symbol rate) that represent all code domain symbol rate. When I/Q Combined Power Bar is set to ON, total is 16 for Subtype 0/1, 32 for Subtype 2. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2) the symbol rate is duplicated. 1st number = 1st code symbol rate over the slot 2nd number = 2nd code symbol rate over the slot . . . Nth number = Nth code symbol rate over the slot When I/Q combined Power Bar is set to OFF, I and Q results are returned alternatively. Total 16 IQ pairs for Subtype 0/1, 32 IQ pairs for Subtype 2. If the active channel occupies more than max spreading factor (16 for Subtype 0/1, 32 for Subtype 2), the symbol rate is duplicated. 1st number = 1st In Phase code symbol rate over the slot. 2nd number = 1st Quad Phase code symbol rate over the slot. ... (2*N–1)th number = Nth In Phase code symbol rate over the slot (2*N)th number = Nth Quad Phase code symbol rate over the slot N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
4	Returns series of floating point numbers that show either active or inactive of each code power returned in n=2 and 3. When the code is inactive, the result is 0.0, otherwise more than 0.0 When I/Q Combined Power Bar is set to ON, total is 16 for Subtype 0/1, 32 for Subtype 2. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2) the active or inactive flag is duplicated. 1st number = 1st code active flag. 2nd number = 2nd code active flag.

	... Nth number = Nth code active flag When I/Q combined Power Bar is set to OFF, I and Q results are returned alternatively. Total 16 IQ pairs for Subtype 0/1, 32 IQ pairs for Subtype 2. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2) the active or inactive flag is duplicated. 1st number = 1st In Phase code active flag. 2nd number = 1st Quad Phase code active flag. ... (2*N–1)th number = Nth In Phase code active flag (2*N)th number = Nth Quad Phase code active flag N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
5	Returns series of floating point numbers (in percent) that represent each symbol in the EVM trace over Meas Interval.
6	Returns series of floating point numbers (in percent) that represent each symbol in the magnitude error trace over Meas Interval.
7	Returns series of floating point numbers (in degree) that represent each symbol in the phase error trace over Meas Interval.
8	Returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace over Meas Interval. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) of symbol 0 and the second is the quadrature-phase (Q) of symbol 0. As in the EVM, there are X points per symbol, so that: 1st number = I of the symbol 0 2nd number = Q of the symbol 0 ... (2*X)+1th number = I of the symbol 1 (2*X)+2th number = Q of the symbol 1 ... (2*X)*Nth + 1 number = I of the symbol N (2*X)*Nth + 2 number = Q of the symbol N
9	Returns series of floating point numbers (in dBm) that represent the entire capture interval data of Symbol Power vs Time.
10	Returns series of floating point numbers (in dBm) that represent the entire capture interval data of Chip Power vs Time.
11	Returns a series of floating point numbers (0.0 or 1.0) of the symbol values (demodulated bits) for the selected spread code. The results are returned as alternating values of I,Q,I,Q . . . for the entire capture interval. In Subtype 2, Data channel take various modulation type, BPSK, QPSK and 8PSK. For QPSK modulation, the queried data represents alternating I and Q sequences as follows: 1st number = in-phase bit of the 1st I/Q pair 2nd number = quad-phase bit of the 1st I/Q pair 3rd number = in-phase bit of the 2nd I/Q pair 4th number = quad-phase bit of the 2nd I/Q pair .....

	(2*N–1)th number = in-phase bit of the Nth I/Q pair (2*N)th number = quad-phase bit of the Nth I/Q pair where N is the number of the symbols in the entire capture length. For 8PSK modulation, the queried data represents alternating s0, s1 and s2 sequence as follows: 1st number = s0 bit of the 1st symbol 2nd number = s1 bit of the 1st symbol 3rd number = s2 bit of the 1st symbol 4th number = s0 bit of the 2nd symbol 5th number = s1 bit of the 2nd symbol 6th number = s2 bit of the 2nd symbol . . . (3*N–2) number = s0 bit of the Nth symbol (3*N–1) number = s1 bit of the Nth symbol (3*N) number = s2 bit of the Nth symbol where N is the number of the symbols in the capture length. If the modulation scheme changes within measurement period, the demod bits also changes following detected modulation scheme. User need to know the slot boundary using READ:TCDP14 modulation scheme result. ACK channel code domain power repeats ON and OFF every half slot. This kind of transmission is called “DTX (Discontinuous Transmission)”. The demod bit with DTX represents “X” and is distinguished from active part bit (0.0 and 1.0).
12	Returns series of floating point numbers (0.0 or 1.0) of symbol values for the selected code with the period selected by Meas Interval and Meas Offset. In Subtype 2, Data channel take various modulation type, BPSK, QPSK and 8PSK. For BPSK modulation, the channel is spreading on I or Q branch and the queried data represents the sequence of I or Q or both of I and Q data which specified by Branch Type(:CALCulate:CDPower:MS:AXIS IPH|QPH|IQCombined); For QPSK modulation, the queried data represents alternating I and Q sequences as follows: 1st number = in-phase bit of the 1st I/Q pair 2nd number = quad-phase bit of the 1st I/Q pair 3rd number = in-phase bit of the 2nd I/Q pair 4th number = quad-phase bit of the 2nd I/Q pair ..... (2*N–1)th number = in-phase bit of the Nth I/Q pair (2*N)th number = quad-phase bit of the Nth I/Q pair where N is the number of the symbols in the selected time by Meas Interval and Meas Offset. For 8PSK modulation, the queried data represents alternating s0, s1 and s2 sequence as follows: 1st number = s0 bit of the 1st symbol 2nd number = s1 bit of the 1st symbol 3rd number = s2 bit of the 1st symbol

4th number = s0 bit of the 2nd symbol

5th number = s1 bit of the 2nd symbol

6th number = s2 bit of the 2nd symbol

. . .

(3*N−2) number = s0 bit of the Nth symbol

(3*N−1) number = s1 bit of the Nth symbol

(3*N) number = s2 bit of the Nth symbol

where N is the number of the symbols in the selected time by Meas Interval and Meas offset.

If Packed mode (:CALCulate:TCDPower:PCKM Off|PKM1) is set to PKM1, the representation of return value changes. Demod bits per symbol are packed into one floating point number in bit-slice manner as following.

For 8PSK modulation, s0 bit, s1 bit and s2 bit are packed into one floating number.

For QPSK modulation, in-phase bit of the 1st I/Q pair and quad-phase bit of the 1st I/Q pair are packed into one floating number.

8PSK (With DTX):Float value 0.....0M0S2S1S0

The meaning of each bit is :

M0:Mask 0 (1:DTX, 0:Normal),

And S2 is x(0), S1 is x(1), S0 is x(2)

QPSK(With DTX): Float value 0.....0M0B1B0

The meaning of each bit is :

M0:Mask for B0,

and B1:I, B0:Q

BPSK(With DTX): Float value 0.....0M0B0

The meaning of each bit is :

M0:Mask 0 (1:DTX, 0:Normal),

B0: I or Q

1st number = Packed Demod bits of 1st symbol

2nd number = Packed Demod bits of 2nd symbol

3rd number = Packed Demod bits of 3rd symbol

...

Nth number = Packed Demod bits of Nth symbol

Where N is the number of the symbols in the selected time by Meas Interval and Meas Offset.

If the modulation scheme changes within measurement period, the demod bits also changes following detected modulation scheme. User need to know the slot boundary using READ:TCDP14 modulation scheme result.

ACK channel code domain power repeats ON and OFF every half slot. This kind of transmission is called “DTX (Discontinuous Transmission)”. The demod bit with DTX represents “X” and is distinguished from the active part bit (0.0 and 1.0).

13 Returns a series of floating point numbers (in dB or dBm) that represents all the code domain errors.

When I/Q Combined Power Bar is set to ON, total is 16 for Subtype 0/1, 32 for Subtype 2. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2) the active or inactive flag is duplicated.

1st number = 1st code domain errors over the measurement period (1slot specified by Meas Offset)

	2nd number = 2nd code domain errors over the measurement period (1slot specified by Meas Offset) ..... Nth number = Nth code domain errors over the measurement period (1slot specified by Meas Offset) When I/Q combined Power Bar is set to OFF, I and Q results are returned alternatively. Total 16 IQ pairs for Subtype 0/1, 32 IQ pairs for Subtype 2. 1st number = 1st in-phase code domain error over the measurement period (1 slot specified by Meas Offset) 2nd number = 1st quad-phase code domain error over the measurement period (1 slot specified by Meas Offset) ... (2*N–1) number = N th in-phase code domain error over the measurement period (1 slot specified by Meas Offset) (2*N) number = N th quad-phase code domain error over the measurement period (1 slot specified by Meas Offset) N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.
14	Returns a series of floating point numbers that represents the modulation scheme slot-by-slot. The meaning of the number is : 0.0 = BPSK 1.0 = QPSK 2.0 = 8PSK n = Capture Interval * 2; 1st number = Modulation Scheme of the first half of slot 0; 2nd number = Modulation Scheme of the second half of slot 0; 3rd number = Modulation Scheme of the first half of slot 1; ... Nth number = Modulation Schme of the second half of slot N/2;

This key invokes the Reverse Link Code Domain Power measurement.

Key Path	Meas
Mode	CDMA1XEV
Initial S/W Revision	Prior to A.02.00

More Information

Amplitude (AMPTD) Y Scale

Accesses a menu of functions that enable you to set the desired vertical scale parameters for the current measurement. The Metrics, I/Q Symbol Polar Vector, and Demod Bits windows do not support the functions in this menu. A blank menu will be displayed.

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

Y Ref Value (Power Bar Graph & Metrics View, Power Bar Graph window)

Sets the power reference value in the Power Bar Graph window.

Key Path	AMPTD Y Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW:WIND:TRAC:Y:RLEV 0 DISP:CDP:MS:VIEW:WIND:TRAC:Y:RLEV?
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.00
Max	250.00
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

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	`[: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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined` `[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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

Y Scale/Div (Power Bar Graph & Metrics View, Power Bar Graph Window)

Sets the vertical scale by changing a power value per division in the Power Bar Graph window of Power Bar Graph & Metrics View.

Key Path	AMPTD Y Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:MS:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:CDP:MS:VIEW:WIND:TRAC:Y:PDIV 10 DISP:CDP:MS:VIEW:WIND:TRAC:Y:PDIV?
Preset	10.0
State Saved	Saved in instrument state.
Min	0.10
Max	20.00
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

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 keyactions 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 1548

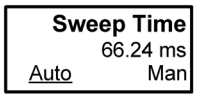
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

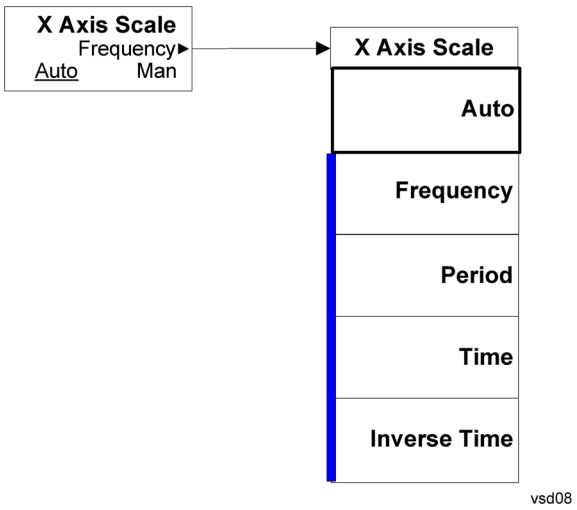
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
vsd08

BW

There is no meas local functionality.

See Front Panel Key for more information.

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

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.

File

See "File" on page 224

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 1557

See Ext Mix Center Freq

See "I/Q Center Freq" on page 1559

See "Center Frequency Presets" on page 1555

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 1555 and "RF Center Freq" on page 1557 and Ext Mix Center Freq and "I/Q Center Freq" on page 1559.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1555 and "RF Center Freq" on page 1557 and "I/Q Center Freq" on page 1559.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1555 and "RF Center Freq" on page 1557 and "I/Q Center Freq" on page 1559.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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
	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

Input/Output

See "Input/Output" on page 176

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Contained within this menu is a 1-of-N selection of the control mode (Normal, Delta, Off) for the selected marker.

For more information, see the Marker key description under the Marker menu in the Spectrum Analyzer Mode, Swept SA Measurement.

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

Marker Type

Sets the marker control mode. If the selected marker is Off, pressing Marker sets it to Normal and places it at the centre 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 symbol value at I/Q Symbol 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 will display the marker value to its full entered precision.

Key Path	Marker
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MODE POSition | DELTa | OFF` `:CALCulate:CDPower:MS:MARKer[1]|2|...12:MODE?`
Example	CALC:CDP:MS:MARK:MODE POS CALC:CDP:MS: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: Marker symbol value at I/Q Symbol Polar Vector graph Marker X-axis value at other graphs The marker X axis value entered in the active function area will display the marker value to its full entered precision.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MODE`
Initial S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to select a relative marker and marker trace.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Contained within this menu is a 1-of-N selection of the control mode (Normal, Delta, Off) for the selected marker.

For more information, see the Marker key description under the Marker menu in the Spectrum Analyzer Mode, Swept SA Measurement.

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

Relative TO

Selects the marker the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:REFerence <integer>` `:CALCulate:CDPower:MS:MARKer[1]|2|...12:REFerence?`
Example	CALC:CDP:MS:MARK:REF 4 CALC:CDP:MS:MARK:REF?
Notes	When queried a single value will be returned (the specified marker numbers relative marker). 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.”

	You must be in the Spectrum Analysis mode, 1xEV-DO 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
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:REFerence`
Initial S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:TRACe CDPower | CDError | SPOWer | CPOWer | EVM | MERRor | PERRor | POLar` `:CALCulate:CDPower:MS:MARKer[1]|2|...12:TRACe?`
Example	CALC:CDP:MS:MARK:TRACE CDE CALC:CDP:MS:MARK:TRACE?
Preset	CDPower
State Saved	Saved in instrument state.
Range	Code Domain Power | Code Domain Error | Symbol Power | Chip Power | EVM | Phase Error | Mag Error
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:TRACe`
Initial S/W Revision	Prior to A.02.00

Couple Marker

Toggles the state of the markers to be coupled On or Off. When this function is true, moving any marker causes an equal X Axis movement of every other marker which 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).

See Couple Marker in the "Marker" section for more information.

Key Path	Marker
Mode	1xEV-DO

Remote Command	:CALCulate:CDPower:MS:MARKer:COUPle[:STATe] ON|OFF|1|0
	:CALCulate:CDPower:MS:MARKer:COUPle[:STATe]?
Example	CALC:CDP:MS:MARK:COUP ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	:CALCulate:TCDPower:MARKer:COUPle[:STATe]
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	1xEV-DO
Remote Command	:CALCulate:CDPower:MS:MARKer:AOFF
Example	CALC:CDP:MS:MARK:AOFF
Backwards Compatibility SCPI	:CALCulate:TCDPower:MARKer:AOFF
Initial S/W Revision	Prior to A.02.00

Marker Symbol Value (Remote Command only)

Sets the marker Symbol value in the current marker for the I/Q Polar trace. It has no effect if the control mode is Off, but if the control mode is Normal, this is the SCPI equivalent of entering a Symble value.

NOTE This command is valid only when Marker Trace 'POLar'(I/Q Polar)is active. For any other Marker Trace, the command is ignored.

Mode	1xEV-DO
Remote Command	:CALCulate:CDPower:MS:MARKer[1]|2|...12:SYMBol <real>
	:CALCulate:CDPower:MS:MARKer[1]|2|...12:SYMBol?
Example	CALC:CDP:MARK:SYMBol 0
	CALC:CDP:MARK:SYMBol?
Notes	This parameter has different meanings when the marker trace is set to I/Q Polar and others cases. In the case of the I/Q Polar Graph, the X Axis Value is also the measured value, so this parameter is meaningful only when the control mode is set to Normal.
	If no suffix is sent, 'chips' will be used. If a suffix is sent that does not match 'chips', an error "Invalid suffix" will be generated.
	The query returns the marker's 'chips' value in the trace if the control mode is Normal The query is

	returned in 'chips'. If the marker is Off the response is not a number (NAN).
Preset	Start point of the trace in the display window
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

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	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:X <real>` `:CALCulate:CDP:MS:MARKer[1]|2|...12:X?`
Example	CALC:CDP:MARK3:X 0.0 CALC:CDP:MARK3:X?
Notes	The marker X Axis value has no unit suffix. For capture time data trace, the unit is second. 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 without unit suffix.
Preset	After a preset, all Markers are turned OFF, so 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

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	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:X:POSition <real>` `:CALCulate:CDPower:MS:MARKer[1]|2|...12:X:POSition?`
Example	CALC:CDP:MARK10:X:POS 0.0

	CALC:CDP:MARK10:X:POS?
Preset	After a preset, all Markers are turned OFF, so 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

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:Y?`
Example	CALC:CDP:MARK11:Y?
Preset	Result dependant on markers setup and signal source
State Saved	No
Initial S/W Revision	Prior to A.02.00

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	CDMA1XEV
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:STATe OFF|ON|0|1` `:CALCulate:CDPower:MS:MARKer[1]|2|...12:STATe?`
Example	CALC:CDP:MS:MARK3:STATe ON CALC:CDP:MS:MARK3:STAT?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:STATe`
Initial S/W Revision	Prior to A.02.00

Marker Fctn

There are no Marker Function operations supported in the Reverse Link Code Domain measurement. The front-panel key will display a blank menu when pressed.

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

Marker To

Accesses menu keys that can copy the current marker value into other parameters, for example Despread. If the currently selected marker is not on when the front-panel key is pressed, it will be turned on at the center of the screen as a normal type marker. See the Marker To key description under Marker.

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

Mkr -> Despread

Executes post process for selected marker.

Key Path	Marker ->, Mkr->Despread
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12[:SET]:DESPread`
Example	CALC:CDP:MS:MARK4:SET:DESP
Notes	This function is available only when the marker trace is either 'CDPower' or 'CDError'.
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4[:SET]:DESPread`
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.**

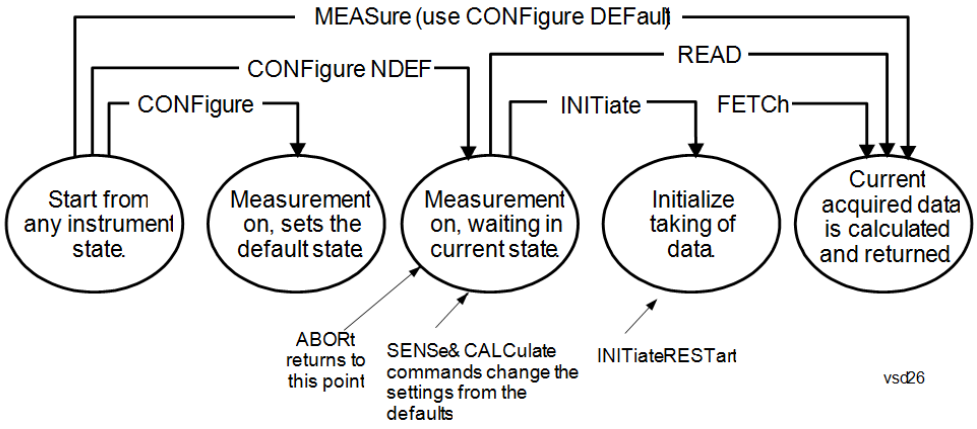
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} \text{Xi}$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{\text{Xi} \in \text{region(s)}} |\text{Xi}|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in region(s)} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in region(s)} Xi\ Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

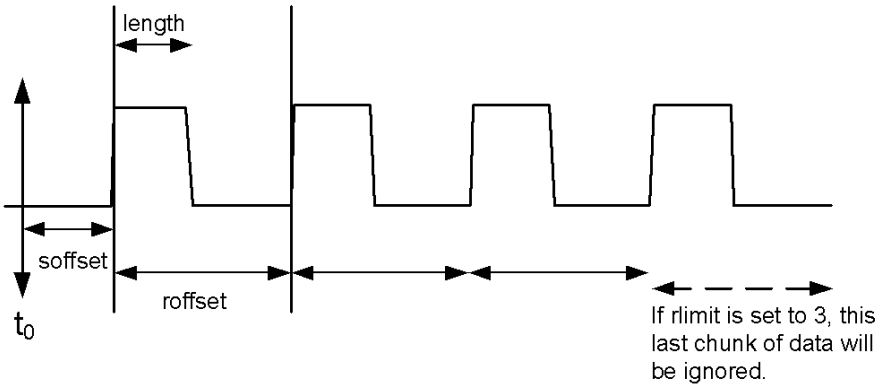
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

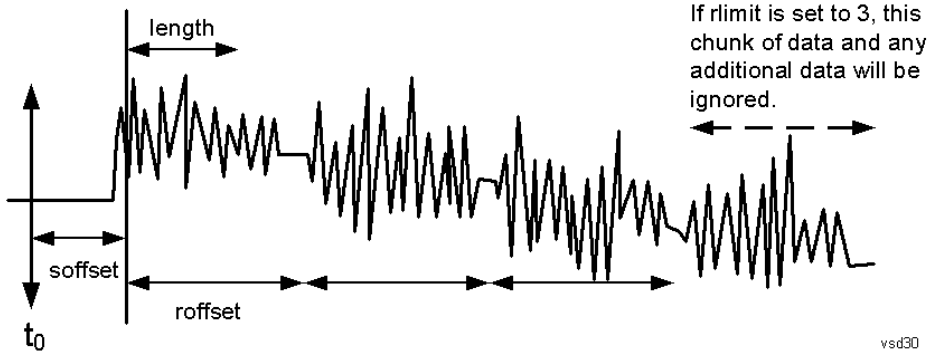
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

Example	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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.

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

Meas Type

Sets the code domain power computation type to either the absolute power or the relative value to the mean power.

Key Path	Meas Setup
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:TYPE RELative|ABSolute` `:CALCulate:CDPower:MS:TYPE?`
Example	CALC:CDP:MS:TYPE ABS CALC:CDP:MS:TYPE?
Preset	RELative
State Saved	Saved in instrument state.
Range	Abs | Rel
Backwards Compatibility SCPI	`CALCulate:TCDPower:TYPE`
Initial S/W Revision	Prior to A.02.00

Walsh Code Length

Sets the Walsh code length to either 4, 8, or 16 for Subtype 0/1. If Physical layer subtype is set to Subtype 2, the setting values shall be 2, 4, 8, 16 or 32. The parameter automatically sets the maximum value for Walsh Code Number when appropriate.

Key Path	Meas Setup
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe:LENGth <integer>` `:CALCulate:CDPower:MS:WCODe:LENGth?`
Example	:CALC:CDP:MS:WCOD:LENG 8 :CALC:CDP:MS:WCOD:LENG?
Notes	Range and Min/Max of this command depends on selected physical layer subtype. When Subtype 0/1 selected, the range is 4, 8,16. When Subtype 2 selected, the range is 2, 4, 8, 16, 32

Couplings	Maximum value of Walsh Code Number is smaller than this value.
Preset	16
State Saved	Saved in instrument state.
Range	2|4|8|16|32
Backwards Compatibility SCPI	`:CALCulate:TCDPower:WCODe:LENGth`
Initial S/W Revision	Prior to A.02.00

Walsh Code Number

Sets the Walsh code number. The upper range is automatically set the maximum value for Walsh Code Length. Therefore there is difference between Subtype 0/1 and Subtype 2.

Key Path	Meas Setup
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe[:NUMBer] <integer>` `:CALCulate:CDPower:MS:WCODe[:NUMBer]?`
Example	:CALC:CDP:MS:WCOD 8 :CALC:CDP:MS:WCOD?
Notes	Range and Min/Max of this command depends on selected physical layer subtype. If need to do SCPI test in the case of Subtype2 by SCPI tree tool, add the test manually.
Couplings	Max is dependent on Walsh Code Length.
Preset	0
State Saved	Saved in instrument state.
Range	0 to 1, when :CALCulate:CDPower:MS:WCODe:LENGth = 2 and Subtype 2 0 to 3, when :CALCulate:CDPower:MS:WCODe:LENGth = 4 0 to 7, when :CALCulate:CDPower:MS:WCODe:LENGth = 8 0 to 15, when :CALCulate:CDPower:MS:WCODe:LENGth = 16 0 to 31, when :CALCulate:CDPower:MS:WCODe:LENGth = 32 and Subtype 2
Min	0
Max	15
Backwards Compatibility SCPI	`CALCulate:TCDPower:WCODe[:NUMBer]`
Initial S/W Revision	Prior to A.02.00

I/Q Branch

Allows you to toggle the selection of the branch signals between I, Q, and IQC (I/Q Combined) for demodulation axis. When the user specifies “I” or “Q”, then both I/Q measured trace and reference points are projected on the I or Q axis, respectively. When the user specifies “IQC”, the I/Q projection is skipped.

Therefore, when the user measures a BPSK signal this parameter must be set to either “I” or “Q”. When the user measures QPSK or 8PSK signals, this parameter should be set to “IQC”. This parameter is effective for symbol analysis, but is not effective for modulation type detection or code power calculation. It is especially useful for the analysis of Subtype 2 channels because most Data channels are I/Q combined.

Key Path	Meas Setup
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:AXIS IPH|QPH|IQCombined` `:CALCulate:CDPower:MS:AXIS?`
Example	:CALC:CDP:MS:AXIS QPH
Preset	IPH
State Saved	Saved in instrument state.
Range	I | Q | IQC
Backwards Compatibility SCPI	`:CALCulate:TCDPower:AXIS`
Initial S/W Revision	Prior to A.02.00

Sync Type

Controls the function to choice the sync type of Reverse Link signal. There are two type for choosing, Pilot Channel and Aux-Pilot Channel.

Pilot Channel: Sync the Reverse Link signal by Pilot Channel

Aux-Pilot Channel: Sync the Reverse Link signal by Aux-Pilot Channel

Key Path	Meas Setup, More 1 of 3 1
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:SYNC PILot|APILot` `[:SENSe]:CDPower:MS:SYNC?`
Example	:SENSe:CDPower:MS:SYNC PILot :SENSe:CDPower:MS:SYNC?
Preset	PILot
State Saved	Saved in instrument state.
Range	PILot | APILot
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:SYNC`
Initial S/W Revision	Prior to A.02.00

Meas Offset

Sets the timing offset of measurement interval in slots.

Key Path	Meas Setup
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:SWEep:OFFSet <real>` `:CALCulate:CDPower:MS:SWEep:OFFSet?`
Example	:CALC:CDP:MS:SWE:OFFS 10 :CALC:CDP:MS:SWE:OFFS?
Notes	If summation of Meas Interval and Meas Offset exceeds Capture Interval after changing Meas Interval (or Meas Offset), then Meas Offset (or Meas Interval) decreases accordingly to keep the summation. Meas interval is effective only for demod bits result. Code Domain Power results are always calculated from an interval of a slot which is specified by Meas Offset.
Couplings	Max value is dependent [:SENSe]:CDPower:MS:CAPTure:TIME and :CALCulate:CDPower:MS:SWEep:TIME
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	31.5
Backwards Compatibility SCPI	`:CALCulate:TCDPower:SWEep:OFFSet`
Initial S/W Revision	Prior to A.02.00

I Long Code Mask

Sets the Long Code Mask value for I axis.

Key Path	Meas Setup, More
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:SYNC:ILCMask <integer>` `[:SENSe]:CDPower:MS:SYNC:ILCMask?`
Example	:CDP:MS:SYNC:ILCM 1 :CDP:MS:SYNC:ILCM?
Preset	00000000000
State Saved	Saved in instrument state.
Range	00000000000 to 4398046511103
Min	00000000000
Max	4398046511103
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:SYNC:ILCMask`
Initial S/W Revision	Prior to A.02.00

Q Long Code Mask

Sets the Long Code Mask value for Q axis.

Key Path	Meas Setup, More 1 of 3
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:SYNC:QLCMask <integer>` `[:SENSe]:CDPower:MS:SYNC:QLCMask?`
Example	:CDP:MS:SYNC:QLCM 1 :CDP:MS:SYNC:QLCM?
Preset	00000000000
State Saved	Saved in instrument state.
Range	00000000000 to 4398046511103
Min	00000000000
Max	4398046511103
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:SYNC:QLCMask`
Initial S/W Revision	Prior to A.02.00

Active Code Channel

Controls the function to identify which code channels are active.

Auto (Auto Active Channel Detection) means system determines Active Channel(s) automatically. Due to algorithm limitation, when the power level is not stable, Auto won't work well.

Predefined means that user specifies which code channel is active manually.

Combination means the code channel selected by Predefine Active Channel is always regarded as Active and moreover Auto Active Channel detection is performed. If Auto finds other active channels, they are also regarded as Active.

Key Path	Meas setup, More 1 of 3
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:ACODe AUTO|COMBination|PREDefined` `[:SENSe]:CDPower:MS:ACODe?`
Example	:CDP:MS:ACOD COMB :CDP:MS:ACOD?
Preset	AUTO
State Saved	Saved in instrument state.
Range	Auto | Combination | Predefined
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:ACODe`
Initial S/W Revision	Prior to A.02.00

Predefined Active Chan

Each channel (Pilot, DRC, RRI, ACK/DSC, Aux-Pilot or Data) can be set Active (On) or Inactive (Off). If Active Code Channel is set to Auto, each selection menu is grayed out. The specified active channels are different due to subtype 0/1 or subtype 2.

Subtype 0/1:

- Pilot/RRI channel – Allows you to set the pilot channel and RRI channel activation on W16(0) I phase.
- DRC channel – Allows you to set the DRC channel activation on W16(8) Q phase.
- ACK channel – Allows you to set the ACK channel activation on W8(4) I phase.
- Data channel – Allows you to set the Data channel activation on W4(2) Q phase.

Subtype 2 or Subtype 3(Basic Mux):

- Pilot channel – Allows you to set the pilot channel activation on W16(0) I phase.
- DRC channel – Allows you to set the DRC channel activation on W16(8) Q phase.
- RRI channel – Allows you to set the RRI channel activation on W16(4) I phase.
- ACK/DSC channel – Allows you to set the ACK channel and DSC channel activation on W32(12) I phase.
- Auxiliary Pilot channel – Allows you to set the Auxiliary Pilot channel activation on W32(28) I phase.
- Data channel – Allows you to set the Data channel activation. The location of Data channel is decided by modulation format. B4 is W4(2) Q phase. Q4 is W4(2). Q2 is W2(1). Q4Q2 is W4(2) and W2(1) with QPSK modulation. E4E2 is W4(2) and W2(1) with 8PSK modulation.

Key Path	Meas Setup, Active Code Channel
Initial S/W Revision	Prior to A.02.00

Pilot/RRI Channel

Allows you to toggle the pilot channel and RRI channel W16(0) I phase activation between On and Off.

Key Path	Meas Setup, More 1 of 3, Active Code Channel,Predefined Active Chan
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:ACODe:PILot OFF|ON|0|1` `[:SENSe]:CDPower:MS:ACODe:PILot?`
Example	:CDP:MS:ACOD:PIL ON :CDP:MS:ACOD:PIL?
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined and the physical layer subtype is set to 0/1/2/3.
Preset	ON

State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:ACODe:PILot`
Initial S/W Revision	Prior to A.02.00

DRC Channel Definition [Common for Subtype 0/1 and Subtype 2/3]

Allows you to toggle the DRC channel W16(8) Q phase activation between On and Off.

Key Path	Meas Setup, More 1 of 3, Active Code Chan,Predefined Active Chan
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:ACODe:DRC OFF|ON|0|1` `[:SENSe]:CDPower:MS:ACODe:DRC?`
Example	:CDP:MS:ACOD:DRC ON :CDP:MS:ACOD:DRC?
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:ACODe:DRC`
Initial S/W Revision	Prior to A.02.00

ACK Channel Definition [Subtype 0/1 only]

Allows you to toggle the ACK channel W8(4) I phase activation between On and Off.

Key Path	Meas Setup, More 1 of 3, Active Code Chan,Predefined Active Chan
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:ACODe:ACK OFF|ON|0|1` `[:SENSe]:CDPower:MS:ACODe:ACK?`
Example	:CDP:MS:ACOD:ACK ON :CDP:MS:ACOD:ACK?
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined and the physical layer subtype is set to 0/1.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off

Backwards Compatibility SCPI	`[:SENSe]:TCDPower:ACODe:ACK`
Initial S/W Revision	Prior to A.02.00

Data Channel Definition [Subtype 0/1 only]

Allows you to toggle the Data channel W4(2) Q phase activation between On and Off.

Key Path	Meas Setup, More 1 of 3, Active Code Chan,Predefined Active Chan
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:ACODe:DATA OFF|ON|0|1` `[:SENSe]:CDPower:MS:ACODe:DATA?`
Example	:CDP:MS:ACOD:DATA ON :CDP:MS:ACOD:DATA?
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined and the physical layer subtype is set to 0/1.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:ACODe:DATA`
Initial S/W Revision	Prior to A.02.00

Sync Start Slot

For the measurement to begin at the first slot, the instrument must depend on trigger timing, or capture timing if the trigger is set to Free Run. If the user employs a trigger, the first slot number measured is determined by the trigger timing. Alternatively, you can specify the synchronization starting slot number. For example, if the Sync start slot number is set to 5, the analysis starts from slot number 5.0. If Sync Start Slot detection mode is set to Off, the measurement is synchronized based on trigger timing or capture timing.

Key Path	Meas Setup, More 1 of 3
Mode	1xEV-DO

Remote Command	`[:SENSe]:CDPower:MS:SSLot:NUMBer <integer>`
	`[:SENSe]:CDPower:MS:SSLot:NUMBer?`
	`[:SENSe]:CDPower:MS:SSLot[:STATe] OFF|ON|0|1`
	`[:SENSe]:CDPower:MS:SSLot[:STATe]?`
	`[:SENSe]:CDPower:MS:SSLot[:STATe] OFF|ON|0|1`
	`[:SENSe]:CDPower:MS:SSLot[:STATe]?`

Example	:CDP:MS:SSL:NUMB 5 :CDP:MS:SSL ON :CDP:MS:SSL?
Notes	The parameter can turn first slot number detection mode on or off.
Preset	0 OFF
State Saved	Saved in instrument state.
Range	0 to 15
Min	0
Max	15
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:SSLot:NUMBer`
Initial S/W Revision	Prior to A.02.00

Capture Interval

Sets the data capture length in slots that will be used in the acquisition.

Key Path	Meas Setup, More 1 of 3
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:CAPTure:TIME <integer>` `[:SENSe]:CDPower:MS:CAPTure:TIME?`
Example	CDP:MS:CAPT:TIME 12 CDP:MS:CAPT:TIME?
Couplings	If Capture interval changed, The maximum value of Measurement interval equal to the capture interval, and the maximum value of measurement offset equal to capture interval –1.
Preset	16
State Saved	Saved in instrument state.
Range	1 to 32
Min	1
Max	32
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:CAPTure:TIME`
Initial S/W Revision	Prior to A.02.00

Spectrum

Sets a spectrum either to Normal or Inverted for the demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

Invert: This 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 low side mix.

Key Path	Meas Setup, More
Mode	1xEV-DO
Remote Command	`[:SENSe]:CDPower:MS:SPECtrum NORMal|INVert` `[:SENSe]:CDPower:MS:SPECtrum?`
Example	CDP:MS:SPEC INV CDP:MS:SPEC?
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal | Invert
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:SPECtrum`
Initial S/W Revision	Prior to A.02.00

Meas Preset

This key allows users to restore all the measurement settings to their defaults.

This will set the measure setup parameters for the currently selected measurement only, to the factory defaults.

Key Path	Meas Setup More 1 of 3, More 2of 3
Mode	1xEV-DO
Remote Command	`:CONFigure:CDPower`
Example	:CONFigure:CDPower:MS
Couplings	Selecting measurement preset will restore all measurement parameters to their default values for the current measurement.
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses a menu of functions that enable you to set up more specific parameters for the measurement.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

Symbol EVM Compensation

Accesses a menu of functions that enable you to set Frequency Compensation and Phase Compensation On or Off for the measurement.

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

Frequency Compensation

Allows you to toggle the setting of the frequency compensation to calculate the symbol EVM.

Key Path	Meas Setup, More 1 of 3, More 2of 3, Advanced, Symbol EVM Compensation
Mode	1xEVDO
Remote Command	`:CALCulate:CDPower:MS:SEVM:FCOMpen ON|OFF|0|1` `:CALCulate:CDPower:MS:SEVM:FCOMpen?`
Example	:CALC:CDP:MS:SEVM:FCOM OFF
Preset	On
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:SEVM:FCOMpen`
Initial S/W Revision	Prior to A.02.00

Active Set Threshold

Sets the threshold value for the active channel detection. And user can select the active channel identification function between Auto and Man. If set to Auto, the active channels are determined automatically by the internal algorithm. If it set to Man, the active channel identification is determined by a user definable threshold ranging from 0.00 to –100.0 dB.

Key Path	Meas Setup, More 1 of 3, More 2of 3, Advanced
Mode	1xEVDO

Remote Command	`:CALCulate:CDPower:MS:ASET:THReshold <real>`
	`:CALCulate:CDPower:MS:ASET:THReshold?`
	`:CALCulate:CDPower:MS:ASET:THReshold:AUTO OFF|ON|0|1`
	`:CALCulate:CDPower:MS:ASET:THReshold:AUTO?`

Example	:CALC:CDP:MS:ASET:THR –20 :CALC:CDP:MS:ASET:THR:AUTO OFF
Notes	Turn the automatic mode On or Off, for the active channel identification function. OFF – The active channel identification for each code channel is determined by a value set by

	CALCulate:CDPower:[MS]:ASET:THReshold. ON – The internal algorithm determines the active channels automatically.
Preset	0.0 ON
State Saved	Saved in instrument state.
Range	–100 to 0.0
Min	–100
Max	0
Backwards Compatibility SCPI	`:CALCulate:TCDPower:ASET:THReshold`
Initial S/W Revision	Prior to A.02.00

Freq Error Tol Range (Frequency Error Tolerance Range)

Frequency error tolerance range is specified:

- Narrow
- Normal
- Wide

See "More Information about Frequency Error Tolerance Range" on page 1608.

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced
Mode	1xEVDO
Remote Command	`[:SENSe]:CDPower:MS:FERRor:TRANge NARRow|NORMal|WIDE` `[:SENSe]:CDPower:MS:FERRor:TRANge?`
Example	:CDP:MS:FERR:TRAN NARR
Preset	NORMal
State Saved	Saved in instrument state.
Range	Narrow | Normal | Wide
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:FERRor:TRANge`
Initial S/W Revision	Prior to A.02.00

More Information about Frequency Error Tolerance Range

Wide' provides a wider, or more loose, range of frequency error tolerance. To correctly demodulate signals of higher complexity, a more stringent frequency tolerance is required. For example, when composite channels are modulated on the same signal, the modulation is more complex, and frequency error is critical to correct synchronization and demodulation, use Narrow. When demodulating less demanding

signals, set to Normal or Wide. The Normal parameter setting allows a higer measurement speed than Wide.

Chip Rate

Changes the Chip Rate as desired frequency.

Key Path	Meas Setup, More 1 of 3, More 2of 3, Advanced
Mode	1xEVDO
Remote Command	`[:SENSe]:CDPower:MS:CRATe <freq>` `[:SENSe]:CDPower:MS:CRATe?`
Example	CDP:MS:CRAT 1.22 MHz
Preset	1.2288 MHz
State Saved	Saved in instrument state.
Range	1.10592 MHz to 1.35168 MHz
Min	1.10592 MHz
Max	1.35168 MHz
Backwards Compatibility SCPI	`[:SENSe]:TCDPower:CRATe`
Initial S/W Revision	Prior to A.02.00

Filter Alpha

Selects one of 4 complementary filters. These complementary filters are designed to have raised cosine frequency responses of slightly different roll off factors, Alpha, conjunction with a TX filter defined in the standard. The smaller the Filter Alpha is, the better the adjacent power rejection performance becomes. Default of this parameter is 0.15.

Key Path	Meas Setup, More, More, Advanced
Mode	1xEVDO
Remote Command	`[:SENSe]:CDPower:MS:ALPHa <real>` `[:SENSe]:CDPower:MS:ALPHa?`
Example	CDP:MS:ALPH 0.05
Preset	0.15
State Saved	Saved in instrument state.
Range	0.05 to 0.20
Min	0.05
Max	0.20
Initial S/W Revision	Prior to A.02.00

Packed Mode [SCPI command only]

Allows you to select the packed mode for Demod bits in SCPI result of READ:TCDP12.

This function makes the demod bits per symbol to pack into one floating value following the detected modulation format. User knows which format is detected on the selected channel using the return value of READ|FETCH:CDP11.

Packed Mode OFF:

The demod bits are returned in binary values, 0 and 1. Bits of off-symbols are represented by –1 when Demod Bit Tri-State is ON.

Packed Mode 1 (PKM1):

The demod bits per symbol plus one mask bit are packed into one floating value. This mask bit is used to indicate whether the channel is active or not. When the code channel is identified as inactive, the mask bit is set to 1. When active, it is set to 0 and resulting packed demod bits values become same as PKM1.

For example, if the detected modulation format is QPSK, the returning demod bits with non-packed mode (default) are following.

0.0, 1.0, 1.0, 0.0, 0.0, 1.0, 1.0, 1.0,.....

QPSK is 2 bits per symbols modulation. Therefore with packed mode 1 (PKM1), by 2 bits are packed into one floating value.

1.0, 2.0, 1.0, 3.0, ...

For 8PSK modulation, by 3 bits are packed into one floating value.

For BPSK modulations, as a result, the demod bits with packed mode and the one with non-packed mode are same because BPSK modulation is 1bit per symbol.

Packed mode is only for SCPI command. And setting to packed mode does not make any changes to the results on MUI. It only controls the result format of READ(MEAS|FETch|CONF):TCDP12.

Mode	1xEVDO
Remote Command	`CALCulate:CDPower:MS:PACKed OFF|PKM1` `CALCulate:CDPower:MS:PACKed?`
Example	CALC:CDP:MS:PACK PKM1
Preset	OFF
State Saved	Saved in instrument state.
Backwards Compatibility SCPI	`CALCulate:TCDPower:PACKed`
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 200

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 1613 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 219

Peak Search

Accesses a menu that enables you to control the peak search function and places a marker on the trace point with highest peak.

See Peak Search under the Peak Search menu in the Spectrum Analyzer Mode, Swept SA Measurement.

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	Front-panel key
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum`
Example	CALC:CDP:MS:MARK2:MAX
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum`
Initial S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the marker's current value.

Key Path	Peak Search
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:NEXT`
Example	CALC:CDP:MS:MARK2:MAX:NEXT
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum:NEXT`
Initial S/W Revision	Prior to A.02.00

Next Pk Right

Moves the selected marker to the nearest peak right of the current marker which meets all enabled peak criteria.

Key Path	Peak Search
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:RIGHt`
Example	CALC:CDP:MS:MARK2:MAX:RIGH
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum:RIGHt`
Initial S/W Revision	Prior to A.02.00

Next Pk Left

Moves the selected marker to the nearest peak left of the current marker which meets all enabled peak criteria.

Key Path	Peak Search
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MAXimum:LEFT`
Example	CALC:CDP:MS:MARK2:MAX:LEFT
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MAXimum: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. Basically this sets the control mode for the selected marker to Delta mode. See the Marker chapter for the complete description of this function. The key is duplicated here in the Peak Search Menu to allow the user 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
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:PTPeak`
Example	CALC:CDP:MS:MARK:PTP
Notes	Turns on the Marker Δ
Couplings	This key is not available (key is grayed out) when Coupled Markers is on.
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:PTPeak`
Initial S/W Revision	Prior to A.02.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	Peak Search
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:MARKer[1]|2|...12:MINimum`
Example	CALC:CDP:MS:MARK:MIN
Backwards Compatibility SCPI	`:CALCulate:TCDPower:MARKer[1]|2|...4:MINimum`
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 229

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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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 1624.

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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

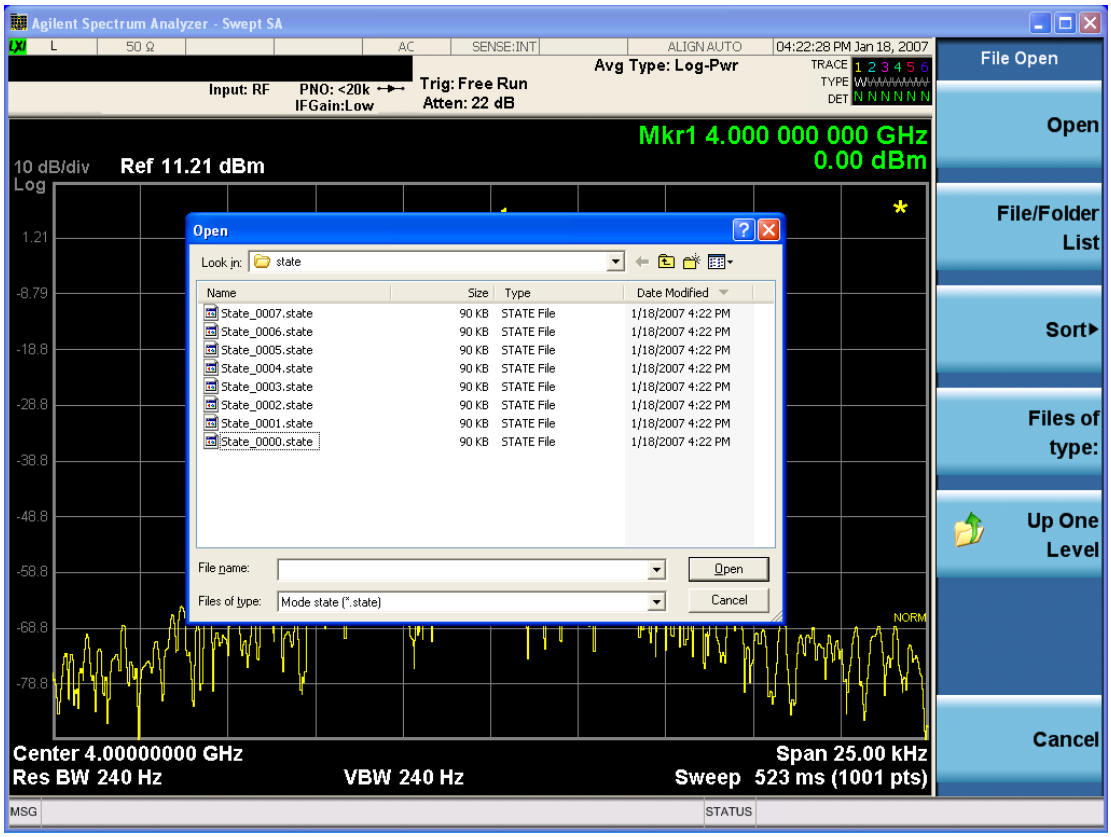
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

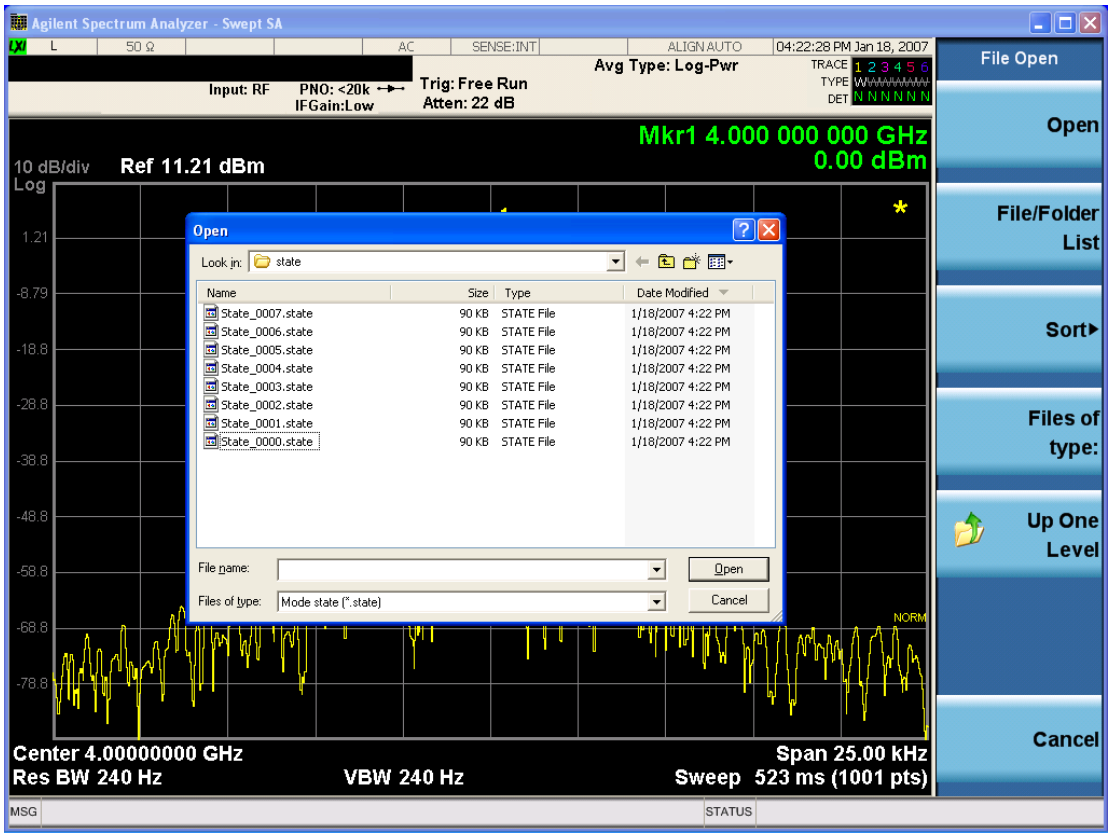
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 1635

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

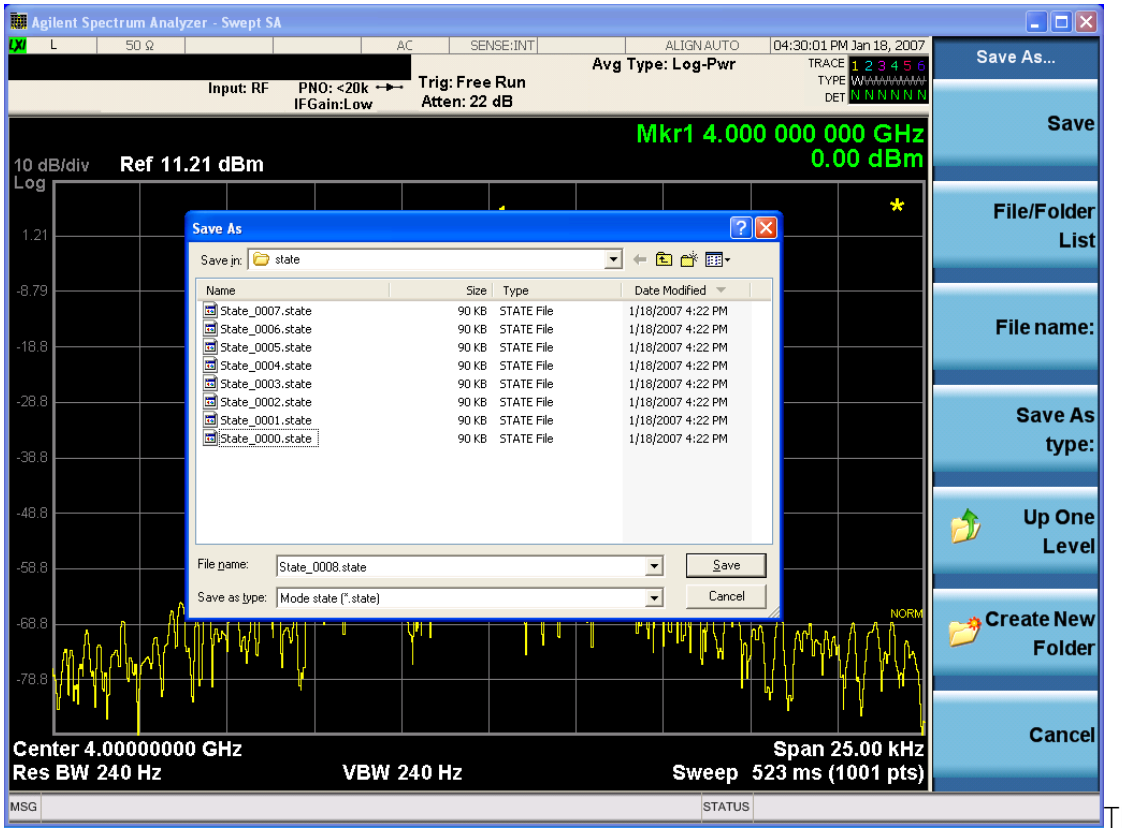
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 1640

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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.

NOTE In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

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	The string must be a valid logical path. 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. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
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	The string must be a valid logical path. Copies 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.

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	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. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which Meas Result to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See "Meas Results File Contents" on page 1649.

See "Marker Table" on page 1649.

See "Peak Table" on page 1652.

See "Spectrogram" on page 1655

Remote Command	`:MMEMory:STORe:RESults:MTABle|PTABle|SPECtrogram <filename>`

Example	:MMEM:STOR:RES:MTAB “myResults.csv” Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB “myResults.csv” Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC “myResults.csv” Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, 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. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

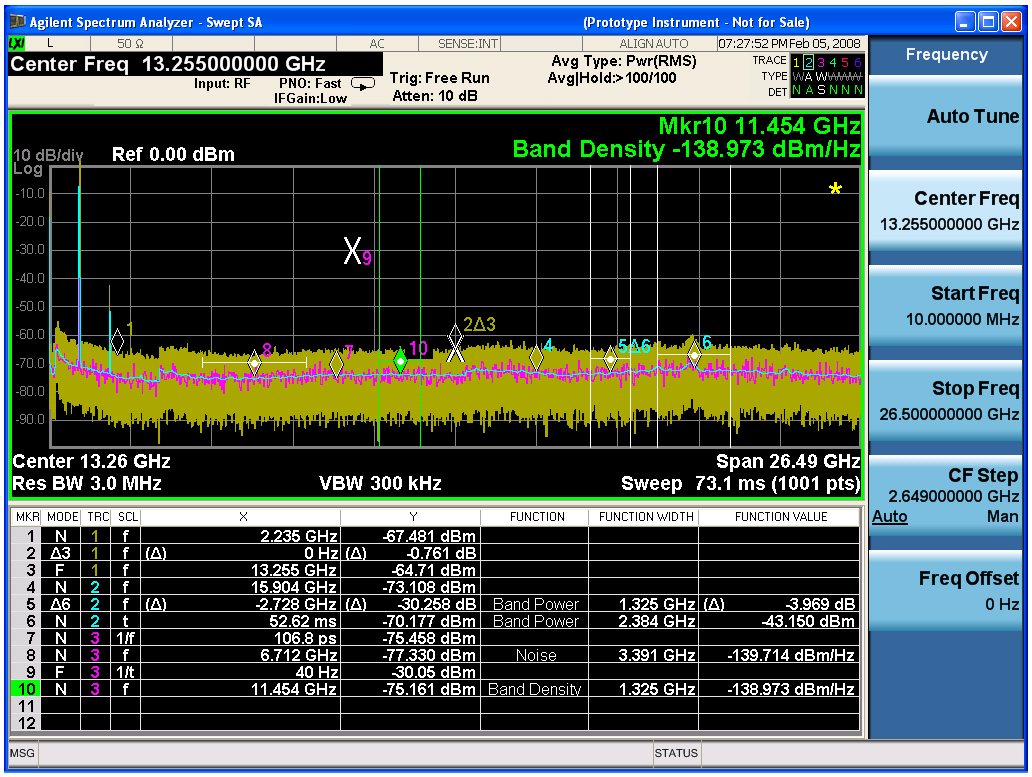
Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.235 GHz	-67.481 dBm			
2	Δ3	1	f	(Δ) 0 Hz	(Δ) -0.761 dB			
3	F	1	f	13.255 GHz	-64.71 dBm			
4	N	2	f	15.904 GHz	-73.108 dBm			
5	Δ6	2	f	(Δ) -2.728 GHz	(Δ) -30.258 dB	Band Power	1.325 GHz	(Δ) -3.969 dB
6	N	2	t	52.62 ms	-70.177 dBm	Band Power	2.384 GHz	-43.150 dBm
7	N	3	1/f	106.8 ps	-75.458 dBm			
8	N	3	f	6.712 GHz	-77.330 dBm	Noise	3.391 GHz	-139.714 dBm/Hz
9	F	3	1/t	40 Hz	-30.05 dBm			
10	N	3	f	11.454 GHz	-75.161 dBm	Band Density	1.325 GHz	-138.973 dBm/Hz
11								
12								

Then the Meas Results file, when opened, would show the following data:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower (Video)
RBW	3000000

RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E–06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
DATA	

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	FUNCTION UNIT
1	Normal	1	Frequency	2.2350E+09	–67.481	Off	0.0000E+00	0	None
2	Delta3	1	Frequency	0.0000E+00	–0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	–64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	–73.1	Off	0.0000E+00	0	None

					08				
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

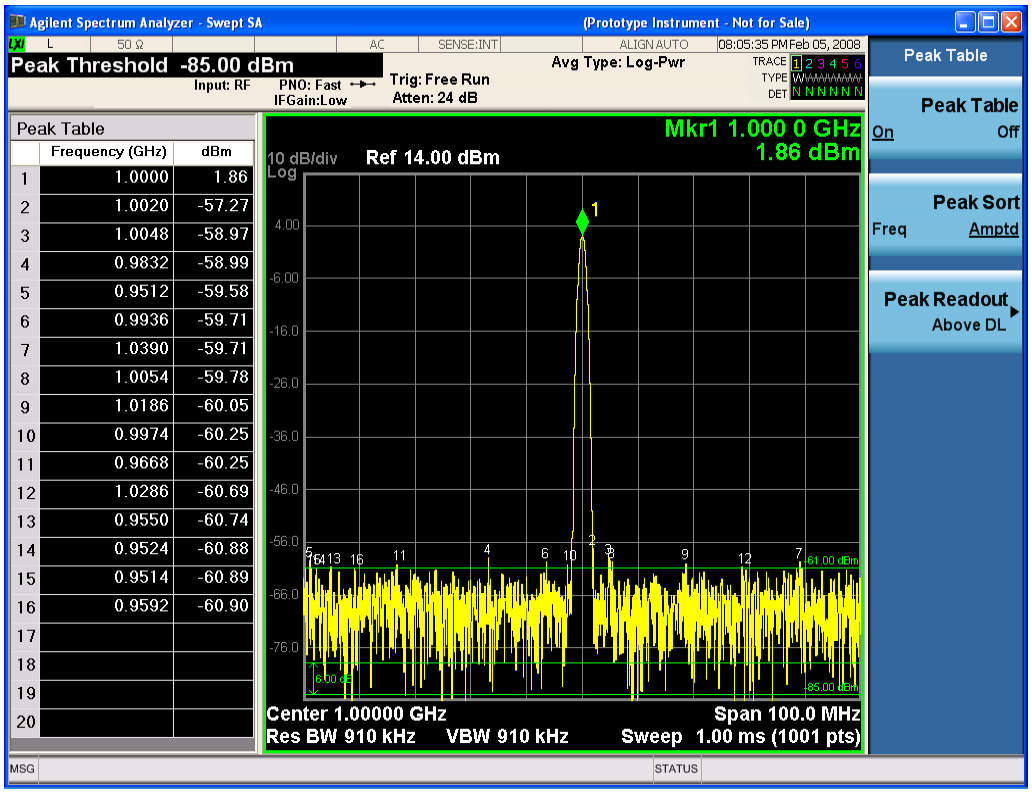
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	–61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	–57.27
3	1.0048E+06	–58.97
4	9.8320E+05	–58.99
5	9.5120E+05	–59.58
6	9.9360E+05	–59.71
7	1.0390E+06	–59.71
8	1.0054E+06	–59.78
9	1.1086E+06	–60.05
10	9.9740E+05	–60.25
11	9.6680E+05	–60.25
12	1.0286E+06	–60.69
13	9.5500E+05	–60.74
14	9.5240E+05	–60.88
15	9.5140E+05	–60.89
16	9.5920E+05	–60.90
17		
18		
19		
20		

Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

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Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

NOTE The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:

For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a duifferent time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 secodns after the Spectrogram started (trace 10 has a strat time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
F03 F07 F13 F26 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	–76.34749519
5999984440	–77.28097006
5999984465	–75.32317869
5999984490	–73.64417681
5999984515	–72.67154604

o

o

o

6000009315	–77.94423277
6000009340	–79.51829697
6000009365	–78.46108961
6000009390	–78.46108957
6000009415	–76.59570596
DATA2	4.708697055

5999984415	–80.98197882
5999984440	–80.98197879
5999984465	–75.83142132
5999984490	–74.02712079
5999984515	–73.57213005

o

o

o

6000009315	–75.9183103
6000009340	–79.53787488
6000009365	–78.82602191
6000009390	–78.82602188
6000009415	–76.37486709
DATA10	0
5999984415	–75.56751112
5999984440	–75.76485645
5999984465	–76.67718717
5999984490	–78.79238489
5999984515	–83.72680212

o

o

o

6000009315	–71.3942461
6000009340	–72.28308332
6000009365	–73.92684489
6000009390	–75.45548832
6000009415	–75.17904815

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

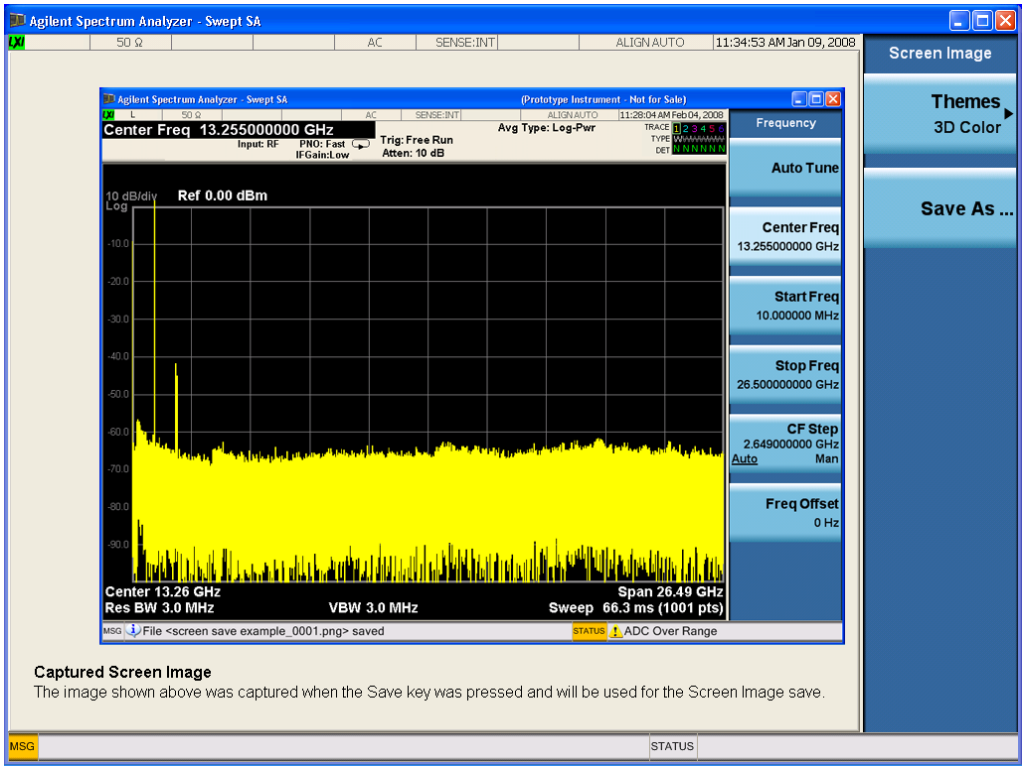
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 1664

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 1667 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	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. 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. 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. 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.
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 the "RF Power Range " on page 1667 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 1667 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 1671, "W-CDMA Channel Number Ranges" on page 1672, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1674, and "LTE FDD Channel Number Ranges" on page 1676.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 806.000 0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 851.000 0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link) Uplink (MS, reverse link) Uplink (MS, reverse link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 450.000 0.025×(N–472)+ 410.000 0.025×(N–1536)+ 479.000
	Downlink (BS, forward link) Downlink (BS, forward link) Downlink (BS, forward link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 460.000 0.025×(N–472)+ 420.000 0.025×(N–1536)+ 489.000

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

Nt = 5*F 0.0 MHz ≤ F≤ 3276.6 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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”. If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 “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 2009 “RMS Calculation Mode” will be coupled to “Auto” mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error “–221 Setting conflict; No waveform is selected for RMS operation”.
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source

Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`

Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns :SOUR:RAD:ARB:TRIG:EXT:DEL? :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms OFF
Min	0 s
Max	8.589934588 s (Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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 desired horizontal scale parameters.

The SPAN X Scale for Power Bar Graph and CDE Graph functions are coupled to each other.

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

X Ref Value

Controls the reference value of the X scale of the current measurement.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, Magnitude Error window)

Sets the reference value on the horizontal axis in the Magnitude Error window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW3:WIND:TRAC:X:RLEV 0 DISP:CDP:MS:VIEW3:WIND:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, Phase Error window)

Sets the reference value on the horizontal axis in the Phase Error window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW3:WIND2:TRAC:X:RLEV 0 DISP:CDP:MS:VIEW3:WIND2:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, EVM window)

Sets the reference value on the horizontal axis in the EVM window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW3:WIND3:TRAC:X:RLEV 0 DISP:CDP:MS:VIEW3:WIND3:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (Code Domain (Quad View) View, Symbol Power window)

Sets the slot power reference value on the horizontal axis in the Symbol Power window of the Code Domain (Quad View) view.

Key Path	Span X Scale
Remote Command	`:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW4:WIND2:TRAC:X:RLEV 0 DISP:CDP:MS:VIEW4:WIND2:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	0.000
State Saved	Saved in instrument state.
Min	–100000
Max	100000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (Demod Bits View, Symbol Power window)

Sets the slot power reference value on the horizontal axis in the Symbol Power window of the Code Domain (Quad View) view.

Key Path	Span X Scale
Remote Command	`:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:CDP:MS:VIEW5:WIND2:TRAC:X:RLEV 0 DISP:CDP:MS:VIEW5:WIND2:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	0.000
State Saved	Saved in instrument state.
Min	–100000
Max	100000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Scale/Div

Sets the horizontal scale by changing a value per division.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, Magnitude Error Window)

Sets the horizontal scale by changing a value per division in the Magnitude Error window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:MS:VIEW3:WIND:TRAC:X:PDIV 10 DISP:CDP:MS:VIEW3:WIND:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.10
Max	500000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, Phase Error Window)

Sets the horizontal scale by changing a value per division in the Phase Error window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:MS:VIEW3:WIND2:TRAC:X:PDIV 10 DISP:CDP:MS:VIEW3:WIND2:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.10
Max	500000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, EVM Window)

Sets the horizontal scale by changing a value per division in the EVM window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:CDP:MS:VIEW3:WIND3:TRAC:X:PDIV 10 DISP:CDP:MS:VIEW3:WIND3:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.10
Max	500000
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (Code Domain (Quad View) View, Symbol Power Window)

Sets the horizontal scale by changing a slot power value per division in the Slot Power window of Code Domain (Quad View) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision <real>`

	:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision?
Example	DISP:CDP:MS:VIEW4:WIND2:TRAC:X:PDIV 10 DISP:CDP:MS:VIEW4:WIND2:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	63.99
State Saved	Saved in instrument state.
Min	0.1
Max	100000
Backwards Compatibility SCPI	:DISPlay:TCDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision
Initial S/W Revision	Prior to A.02.00

X Scale/Div (Demod Bits View, Symbol Power Window)

Sets the horizontal scale by changing a slot power value per division in the Symbol Power window of Demod Bits View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:PDIVision <real> :DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:PDIVision?
Example	DISP:CDP:MS:VIEW5:WIND2:TRAC:X:PDIV 10 DISP:CDP:MS:VIEW5:WIND2:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode.
Preset	63.99
State Saved	Saved in instrument state.
Min	0.1
Max	100000
Backwards Compatibility SCPI	:DISPlay:TCDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:PDIVision
Initial S/W Revision	Prior to A.02.00

X Ref Position

Sets the reference position of the X axis on the display. The reference position can be set to Left, Ctr (Center) or Right.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, Magnitude Error window)

Sets the reference position of the X axis in the Magnitude Error window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:MS:VIEW3:WIND:TRAC:X:RPOS RIGH DISP:CDP:MS:VIEW3:WIND:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, Phase Error window)

Sets the reference position of the X axis in the Phase Error window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:MS:VIEW3:WIND2:TRAC:X:RPOS RIGH DISP:CDP:MS:VIEW3:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, EVM window)

Sets the reference position of the X axis in the EVM window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:MS:VIEW3:WIND3:TRAC:X:RPOS RIGH DISP:CDP:MS:VIEW3:WIND3:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (Code Domain (Quad View) view, Symbol Power window)

Sets the reference position of the X axis in the Symbol Power view of the Code Domain (Quad View) view.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:MS:VIEW4:WIND2:TRAC:X:RPOS RIGH DISP:CDP:MS:VIEW4:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (Demod Bits view, Symbol Power window)

Sets the reference position of the X axis in the Symbol Power view of the Demod Bits view.

Key Path	Span X Scale

Mode	1XEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:CDP:MS:VIEW5:WIND2:TRAC:X:RPOS RIGH DISP:CDP:MS:VIEW5:WIND2:TRAC:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Determines the scale per division and reference value for the X axis based on the current measurement results.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

Auto Scaling (I/Q Error (Quad View) View, Magnitude Error window)

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the Magnitude Error view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON` `:DISPlay:CDPower:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:MS:VIEW3:WIND:TRAC:X:COUP ON DISP:CDP:MS:VIEW3:WIND:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. 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	Off|On

Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Auto Scaling (I/Q Error (Quad View) View, Phase Error window)

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the Phase Error view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON` `:DISPlay:CDPower:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:MS:VIEW3:WIND2:TRAC:X:COUP ON DISP:CDP:MS:VIEW3:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. 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	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Auto Scaling (I/Q Error (Quad View) View, EVM window)

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the EVM view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON` `:DISPlay:CDPower:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:MS:VIEW3:WIND3:TRAC:X:COUP ON DISP:CDP:MS:VIEW3:WIND3:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on

	the measurement results if this parameter is set to On. 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	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Auto Scaling (Code Domain (Quad View) View, Symbol Power Window)

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the Symbol Power view of Code Domain (Quad View) View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON` `:DISPlay:CDPower:MS:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:CDP:MS:VIEW4:WIND2:TRAC:X:COUP ON DISP:CDP:MS:VIEW4:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. 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	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Auto Scaling (Demod Bits View, Symbol Power Window)

When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically displays the scale per division and reference value results in the Symbol Power view of Demod Bits View.

Key Path	Span X Scale
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF |`

	ON :DISPlay:CDPower:MS:VIEW5:WINDow2:TRACe:X[:SCALe]:COUPle?
Example	DISP:CDP:MS:VIEW5:WIND2:TRAC:X:COUP ON DISP:CDP:MS:VIEW5:WIND2:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. 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	Off|On
Backwards Compatibility SCPI	:DISPlay:TCDPower:VIEW5:WINDow2:TRACe:X[:SCALe]:COUPle
Initial S/W Revision	Prior to A.02.00

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.

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

Pause/Resume

This key allows you to pause or resume the measurement of the displayed signal.

See Pause/Resume function.

Key Path	Sweep/Control
Initial S/W Revision	Prior to A.02.00

System

See "System" on page 230

Trace/Detector

There is no meas local functionality. See Trace/Detector.

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

Trigger

See "Trigger" on page 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Offset Adjust (Remote Command Only)

See "Offset Adjust (Remote Command Only)" on page 1484

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Holdoff Type

See ___ on page X

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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.

See the section Front Panel Key for more information.

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

View Selection by Name

Key Path	View/Display
Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW[:SELect] PGRaph | CDPError | SEVM | QUAD | DBITs` `:DISPlay:CDPower:MS:VIEW[:SELect]?`
Example	DISP:CDP:MS:VIEW PGR DISP:CDP:MS:VIEW?
Notes	You must be in the 1xEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	PGRaph
State Saved	Saved in instrument state.
Range	Power Graph & Metrics | CDP Graph & CDE Graph | I/Q Error (Quad View) | Code Domain (Quad View) | Demod Bits
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW[:SELect]`
Initial S/W Revision	Prior to A.02.00

View Selection by number (Remote Command only)

Displays the numeric values of the measurement results. This function is available by SCPI command only.

Mode	1xEV-DO
Remote Command	`:DISPlay:CDPower:MS:VIEW:NSELect <integer>` `:DISPlay:CDPower:MS:VIEW:NSELect?`
Example	DISP:CDP:MS:VIEW:NSEL 2 DISP:CDP:MS:VIEW:NSEL?
Notes	You must be in the 1XEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1

Max	5
Backwards Compatibility SCPI	`:DISPlay:TCDPower:VIEW:NSELect`
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.

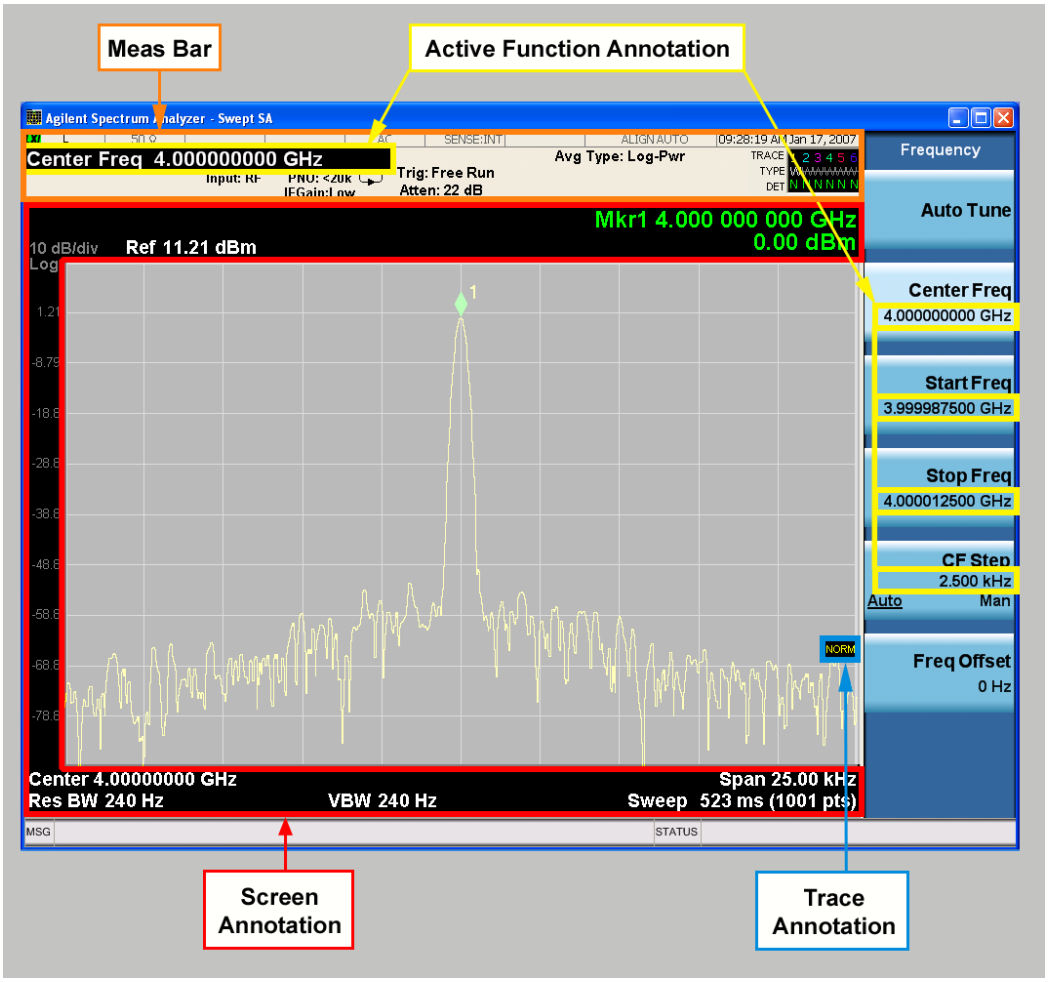
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

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

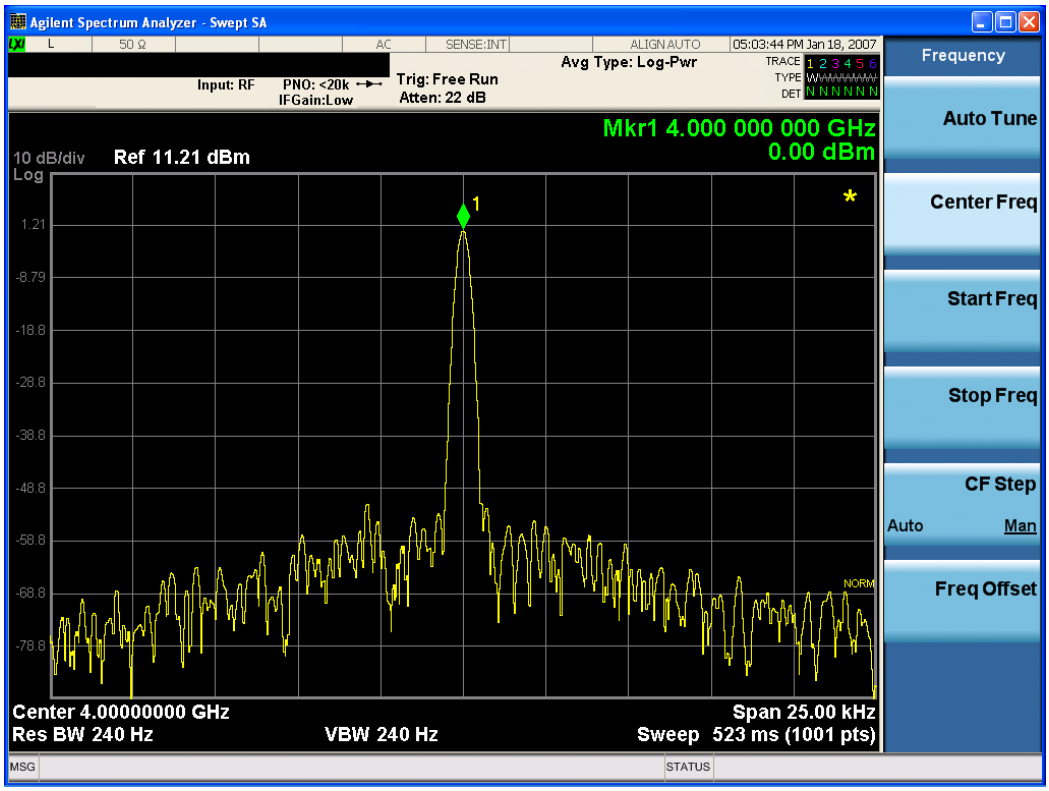
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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

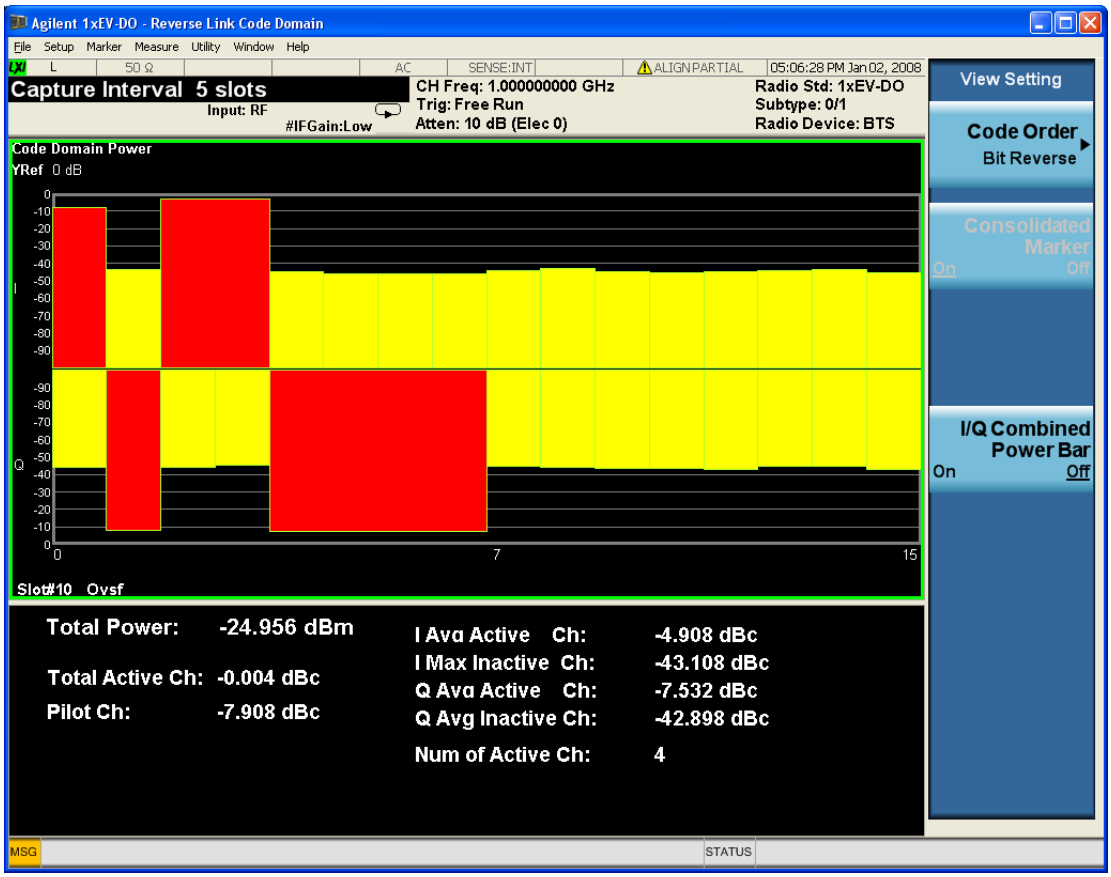
Power Graph & Metrics

Provides a combination view of the code domain power graph and the summary data.

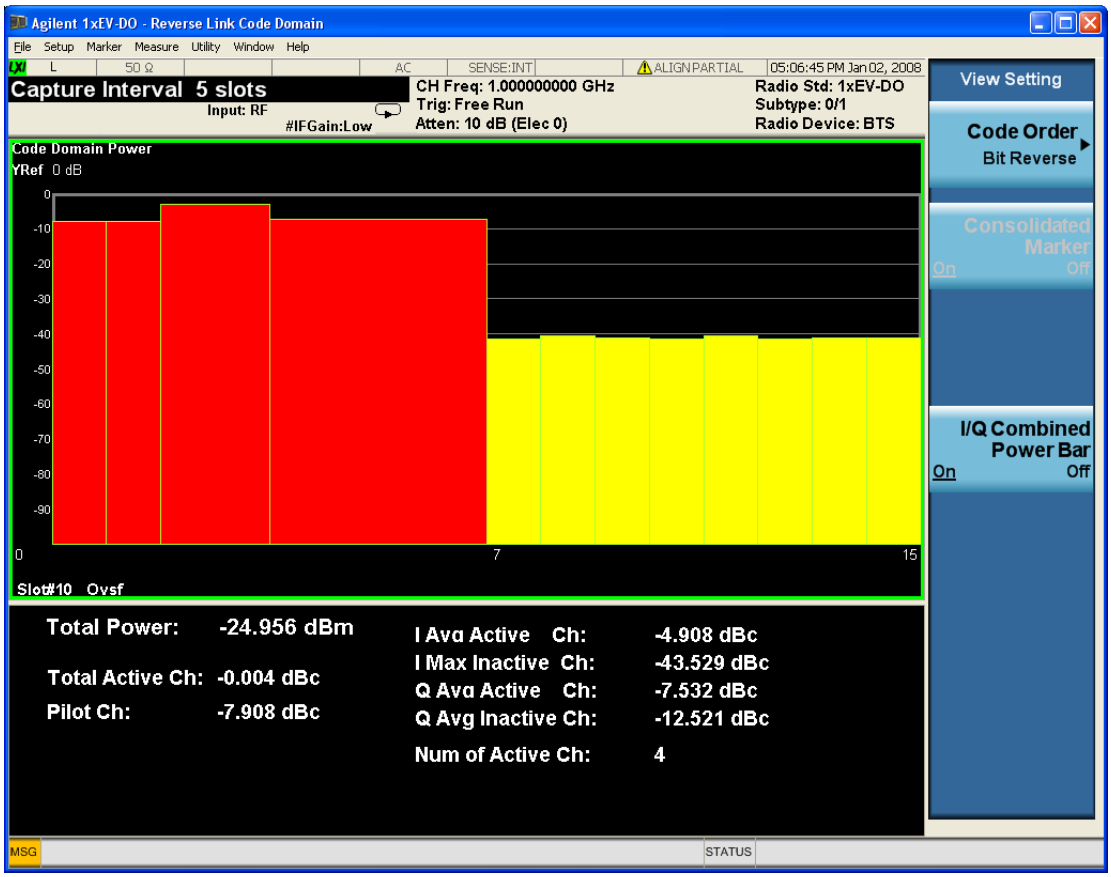
This view shows code domain power and its numeric results. There are two windows:

- "Power Bar Graph window" on page 1800 (upper)
- "Metrics window" on page 1800 (lower)

The figure below shows Power Graph & Metrics View when setting IQ Combined Off.



The figure below shows Power Graph & Metrics View when setting IQ Combined On.



Power Bar Graph window

Show code domain power.

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

This trace is of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Metrics window

Name	Corresponding Results	Display Format
Total Power	n=1 9th Total Power	-99.99 dBm
Total Active Ch	n=1 7th Total active power	-999.999 dB/dBm
Pilot	n=1 8th Pilot power	-99.999 dB/dBm
I Avg Active Ch	n=1 15th	-999.999 dB/dBm

Name	Corresponding Results	Display Format
	I channel Average active code power	
I Max Inactive Ch	n=1 16th I channel Max inactive code power	–999.999 dB/dBm
Q Avg Active Ch	n=1 17th Q channel Average active code power	–99.999 dB/dBm
Q Max Inactive Ch	n=1 18th Q channel Max inactive code power	–99.999 dB/dBm

These scalar results are of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Unit is switched by Meas Type key.

Example	DISP:CDP:MS:VIEW PGR DISP:CDP:MS:VIEW?
Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:CDPower:MS:WCODe:ORDer?`
Example	:CALC:CDP:MS:WCOD:ORD BREV
Notes	This key appears when Code Domain Power window is active.
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard | Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TCDPower:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggles the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker

Mode	1xEVDO
Remote Command	`:DISPlay:CDPower:MS:MARKer:CONSolidated ON|OFF|1|0` `:DISPlay:CDPower:MS:MARKer:CONSolidated?`
Example	:DISPlay:CDPower:MS:MARKer:CONSolidated ON :DISPlay:CDPower:MS:MARKer:CONSolidated?
Notes	This soft key is displayed only when the CDP window is selected. This key is grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power. You must be in the 1xEVDO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:MARKer:CONSolidated`
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively.

Code Domain Power when I/Q Combined Power Bar is set to OFF.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:IQ:COMBined[:STATe] 0|1|OFF|ON` `:CALCulate:CDPower:MS:IQ:COMBined[:STATe]?`
Example	:CALC:CDP:MS:IQ:COMB ON :CALC:CDP:MS:IQ:COMB?
Notes	You must be in the 1xEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:IQ:COMBined[:STATe]`
Initial S/W Revision	Prior to A.02.00

CDP Graph & CDE Graph

Provides a combination view of the code domain power graph and the code domain error.

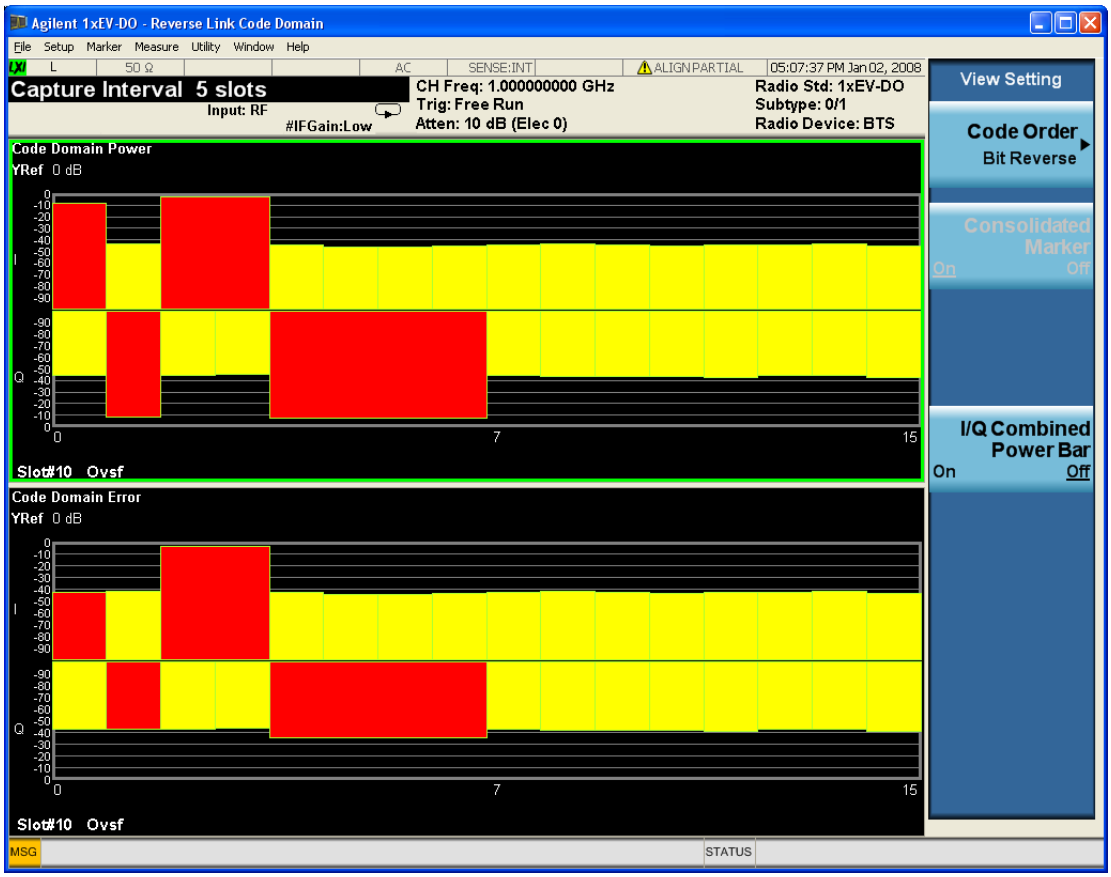
There are two windows:

- "Code Domain Power Bar Graph window" on page 1804 (upper)
- "Code Domain Error Bar Graph window" on page 1804 (lower)

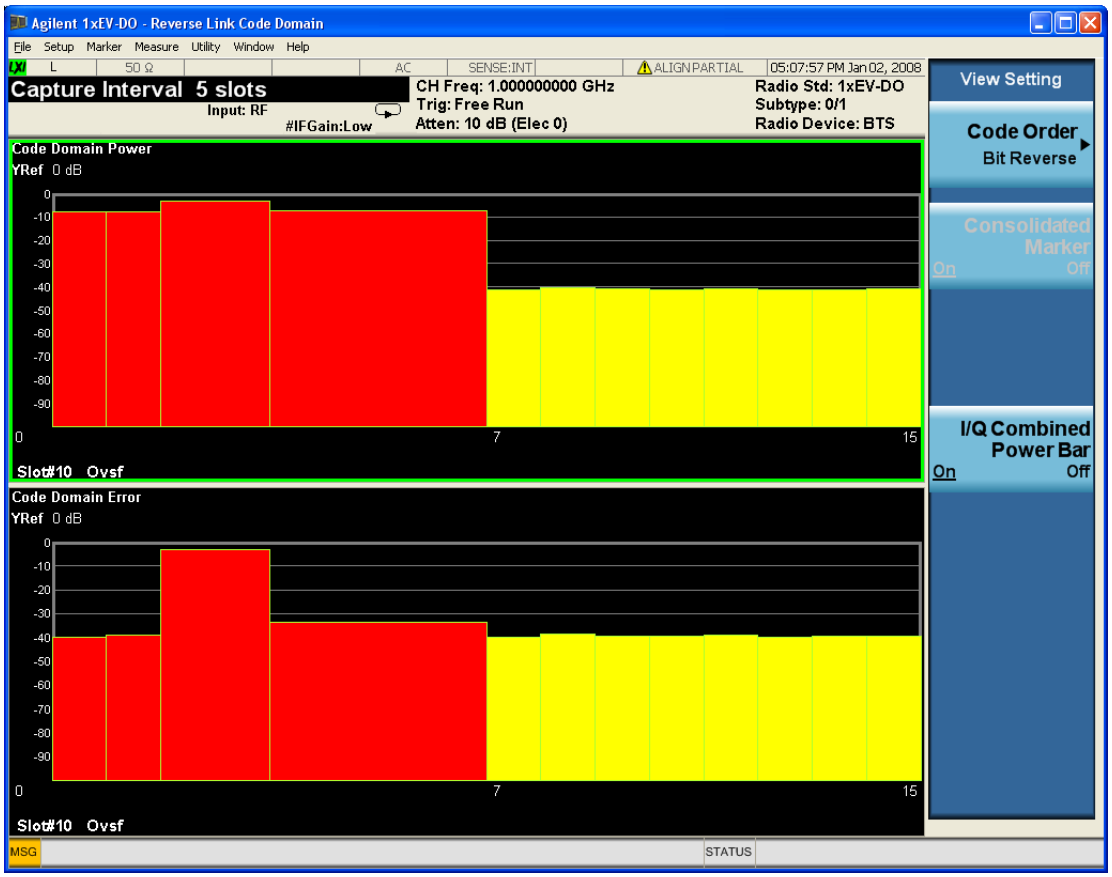
The two windows of Power Bar Graph and CDE graph are coupled in terms of:

- X/Y Scaling
- Composite Symbol Boundary, Display Symbol Rate

The figure below shows CDP Graph and CDE Graph View when setting IQ Combined Off.



The figure below shows CDP Graph and CDE Graph View when setting IQ Combined On.



Code Domain Power Bar Graph window

Show code domain power.

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

This trace is of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Code Domain Error Bar Graph window

Show code domain error.

Marker Operation	Yes
Corresponding Trace	CDError (n=8)

This trace is of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Example	DISP:CDP:MS:VIEW CDPE DISP:CDP:MS:VIEW?

Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:CDPower:MS:WCODe:ORDer?`
Example	:CALC:CDP:MS:WCOD:ORD BREV
Notes	This key appears when Code Domain Power window is active.
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard | Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TCDPower:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggles the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker
Mode	1xEVDO
Remote Command	`:DISPlay:CDPower:MS:MARKer:CONSolidated ON|OFF|1|0` `:DISPlay:CDPower:MS:MARKer:CONSolidated?`
Example	:DISPlay:CDPower:MS:MARKer:CONSolidated ON :DISPlay:CDPower:MS:MARKer:CONSolidated?
Notes	This soft key is displayed only when the CDP window is selected. This key is grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power. You must be in the 1xEVDO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:MARKer:CONSolidated`
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively.

Code Domain Power when I/Q Combined Power Bar is set to OFF.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:IQ:COMBined[:STATe] 0|1|OFF|ON` `:CALCulate:CDPower:MS:IQ:COMBined[:STATe]?`
Example	:CALC:CDP:MS:IQ:COMB ON :CALC:CDP:MS:IQ:COMB?
Notes	You must be in the 1xEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:IQ:COMBined[:STATe]`
Initial S/W Revision	Prior to A.02.00

I/Q Error (Quad View) - Symbol EVM

Provides a combination view of magnitude error, phase error, Symbol EVM, and the summary data.

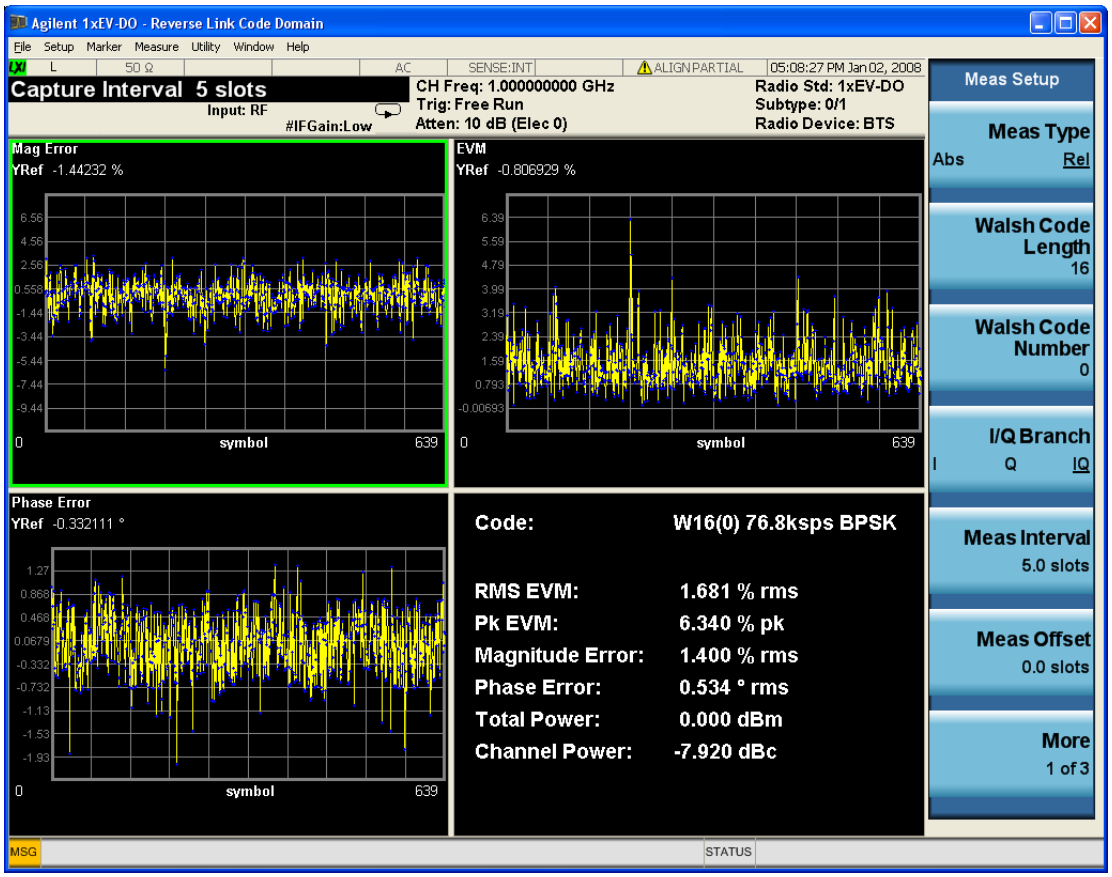
There are four windows:

- "Magnitude Error window" on page 1807 (upper left)
- "Phase Error window" on page 1807 (upper right)
- "Symbol EVM window" on page 1807 (lower left)
- "Metrics window" on page 1808 (lower right)

The Metrics window is exactly same as one in Code Domain (Quad View) view.

Result metrics window indicates the modulation scheme (“BPSK”, “QPSK” or “8PSK”) that was used in the measurement. If “Active Code Chan” setting is “Auto” or “Combination”, the result is auto-detected one. If the setting is “Predefined”, the result is the same as the specified one. The result of modulation scheme shows with data channel analysis when “Physical Layer subtype” is set to 2.

The figure below shows I/Q Error (Quad View) View.



Magnitude Error window

Marker Operation	Yes
Corresponding Trace	MERRor (n=6)

Phase Error window

Marker Operation	Yes
Corresponding Trace	PERRor (n=7)

Symbol EVM window

Marker Operation	Yes
Corresponding Trace	EVM (n=5)

Metrics window

Name	Corresponding Results	Display Format
Code Number	NA	WX(Y) N ksps Mod Format X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1) N: 38.4,76.8, 153.6 ..., 614.4 ksps Mod Format: the detected modulation format with data channel analysis and Subtype 2 only. (BPSK, QPSK, 8PSK)
RMS EVM	n=1 1st RMS symbol EVM	99.99 % rms
Pk EVM	n=1 2nd Peak symbol EVM	99.99 % pk
Magnitude Error	n=1 3rd Symbol magnitude error	99.99 % rms
Phase Error	n=1 4th Symbol phase error	99.99 °rms
Total Power	n=1 5th Total power	–99.99 dBm
Channel Power	n=1 6th Channel Power	–99.99 dB/dBm

Unit is switched by Meas Type key.

Example	DISP:CDP:MS:VIEW SEVM DISP:CDP:MS:VIEW?
Initial S/W Revision	Prior to A.02.00

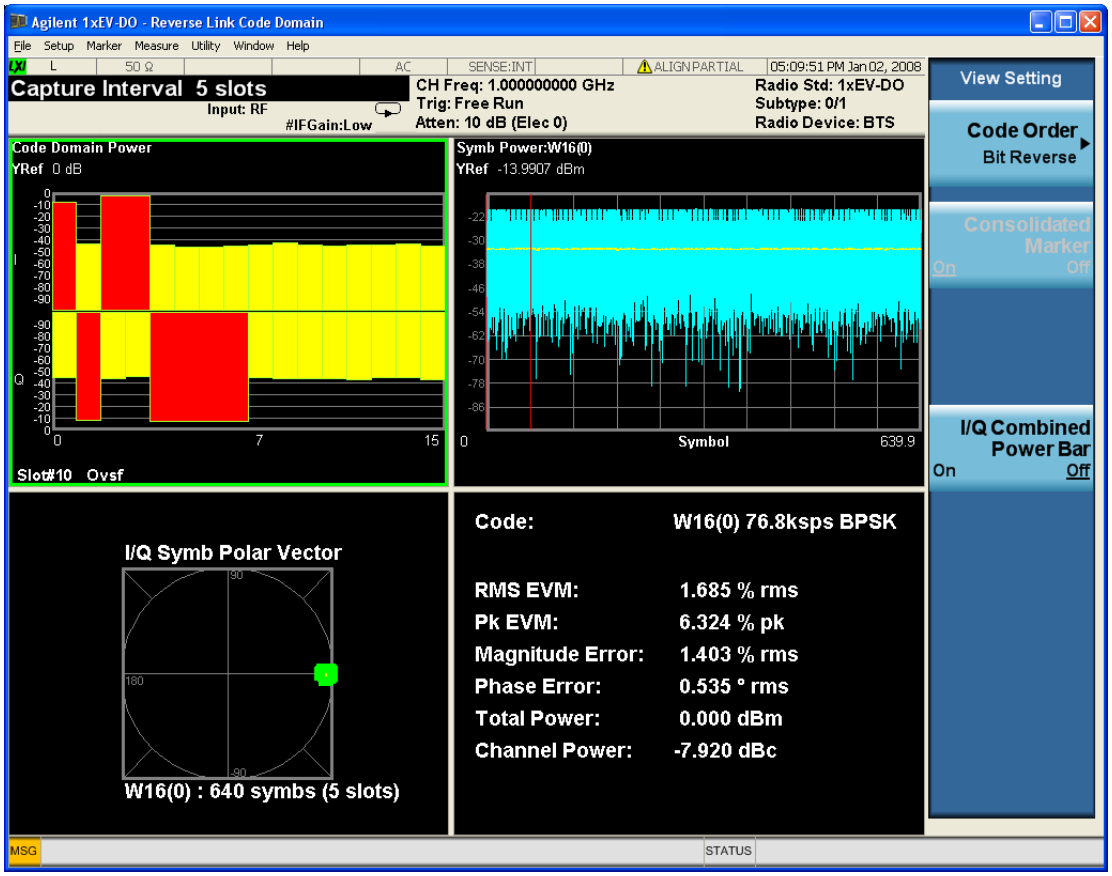
Code Domain (Quad View)

Provides a combination view for the code domain power symbol power, I/Q symbol polar vector and the summary data.

There four windows:

- "Power Bar Graph window" on page 1809 (upper-left)
- "Symbol/Chip Power vs Time window" on page 1809 (upper right)
- "I/Q Symbol Polar Vector window" on page 1809 (lower-left)
- "Metrics window" on page 1810 (lower- right)

The figure below shows Code Domain (Quad View) View.



Power Bar Graph window

This trace is of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Symbol/Chip Power vs Time window

Marker Operation	Yes
Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

I/Q Symbol Polar Vector window

This trace is of the slots specified by the Meas Offset and Meas Interval.

Marker Operation	
Corresponding Trace	(n=5)

Metrics window

Name	Corresponding Results	Display Format
Code Number	NA	WX(Y) N ksps Mod Format X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1) N: 38.4,76.8, 153.6 ..., 614.4 ksps Mod Format: the detected modulation format with data channel analysis and Subtype2 only. (BPSK, QPSK, 8PSK)
RMS EVM	n=1 1st RMS symbol EVM	99.99 % rms
Pk EVM	n=1 2nd Peak symbol EVM	99.99 % pk
Magnitude Error	n=1 3rd Symbol magnitude error	99.99 % rms
Phase Error	n=1 4th Symbol phase error	99.99 °rms
Total Power	n=1 5th Total power	–99.99 dBm
Channel Power	n=1 6th Channel Power	–99.99 dB/dBm

Unit is switched by Meas Type key.

Example	DISP:CDP:MS:VIEW QUAD DISP:CDP:MS:VIEW?
Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:CDPower:MS:WCODe:ORDer?`

Example	:CALC:CDP:MS:WCOD:ORD BREV
Notes	This key appears when Code Domain Power window is active.
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard | Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TCDPower:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggles the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker
Mode	1xEVDO
Remote Command	`:DISPlay:CDPower:MS:MARKer:CONSolidated ON|OFF|1|0` `:DISPlay:CDPower:MS:MARKer:CONSolidated?`
Example	:DISPlay:CDPower:MS:MARKer:CONSolidated ON :DISPlay:CDPower:MS:MARKer:CONSolidated?
Notes	This soft key is displayed only when the CDP window is selected. This key is grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power. You must be in the 1xEVDO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TCDPower:MARKer:CONSolidated`
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively.

Code Domain Power when I/Q Combined Power Bar is set to OFF.

Key Path	View/Display, Power Graph & Metrics

Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:IQ:COMBined[:STATe] 0|1|OFF|ON` `:CALCulate:CDPower:MS:IQ:COMBined[:STATe]?`
Example	:CALC:CDP:MS:IQ:COMB ON :CALC:CDP:MS:IQ:COMB?
Notes	You must be in the 1xEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`:CALCulate:TCDPower:IQ:COMBined[:STATe]`
Initial S/W Revision	Prior to A.02.00

Demod Bits

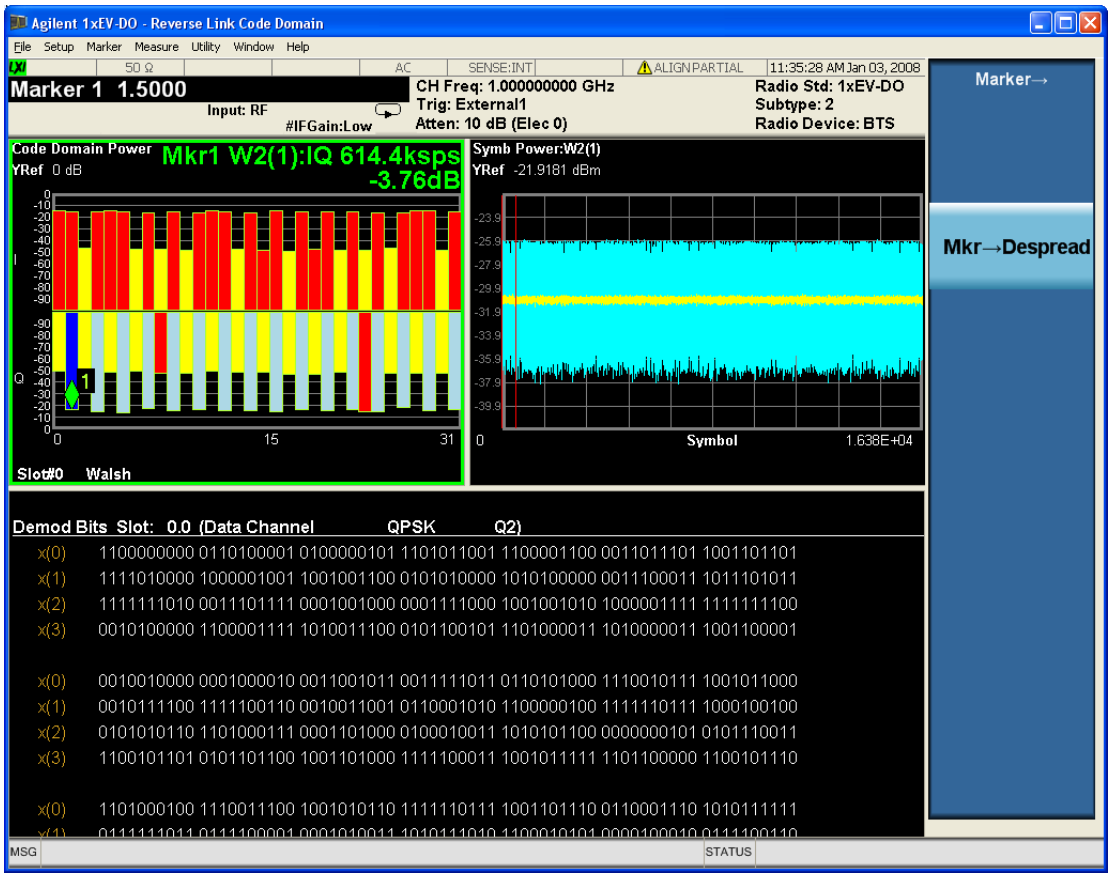
Provides a combination view of the graphs for the code domain power and chip power, and the I/Q demodulated bit stream data for slots selected by the measurement interval and measurement offset.

There are three windows:

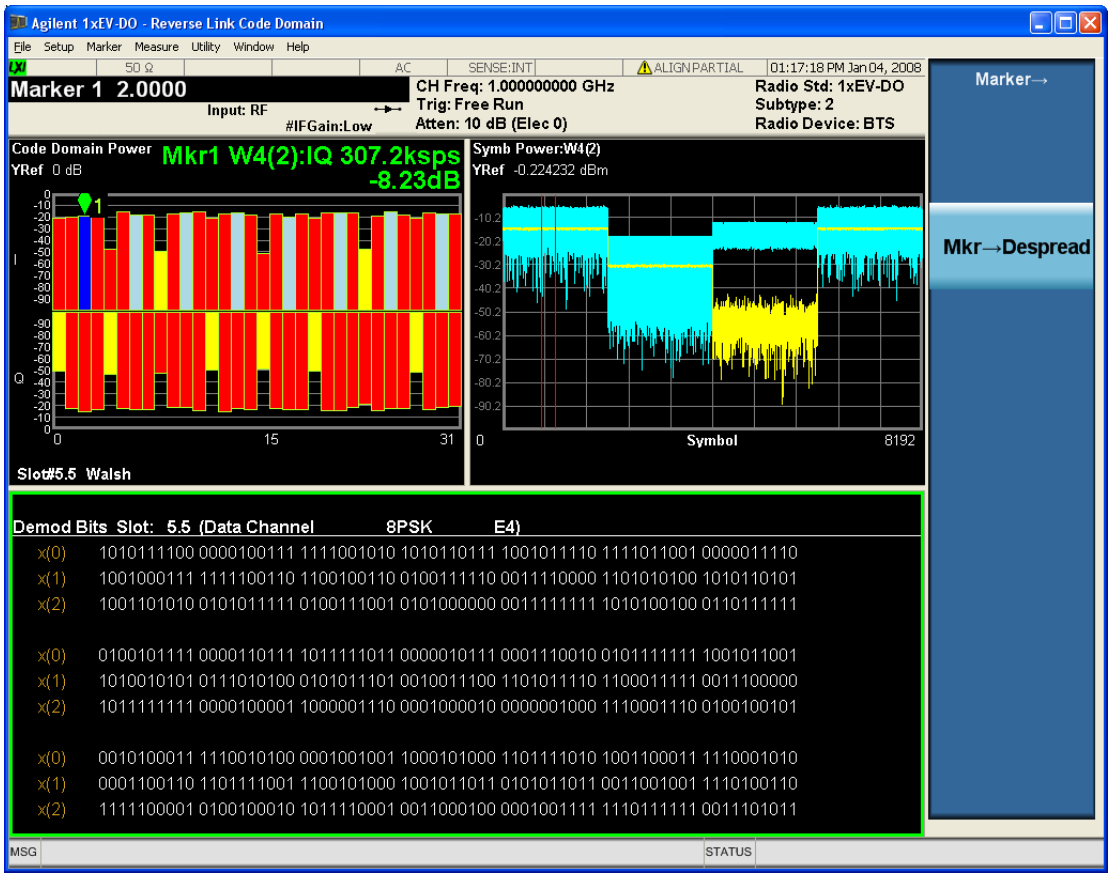
- "Power Bar Graph window" on page 1819 (upper-left)
- "Symbol/Chip Power window" on page 1819 (upper-right)
- "Demod Bits window" on page 1819 (lower)

And in Subtype 2, the number of symbols for data channel is over 2 code symbols. Therefore the prefix changes when the data channel with Q2, E4 and E2 modulation format.

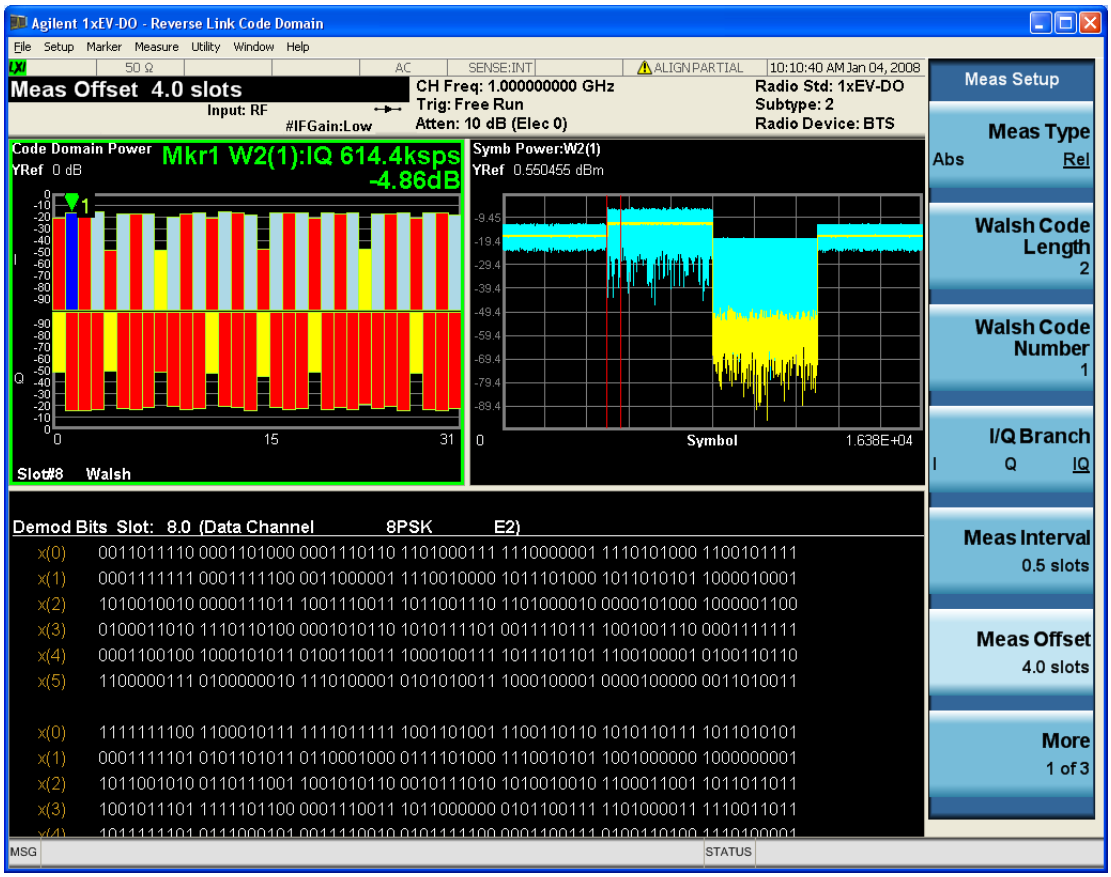
- Q2 modulation format



- E4 modulation format

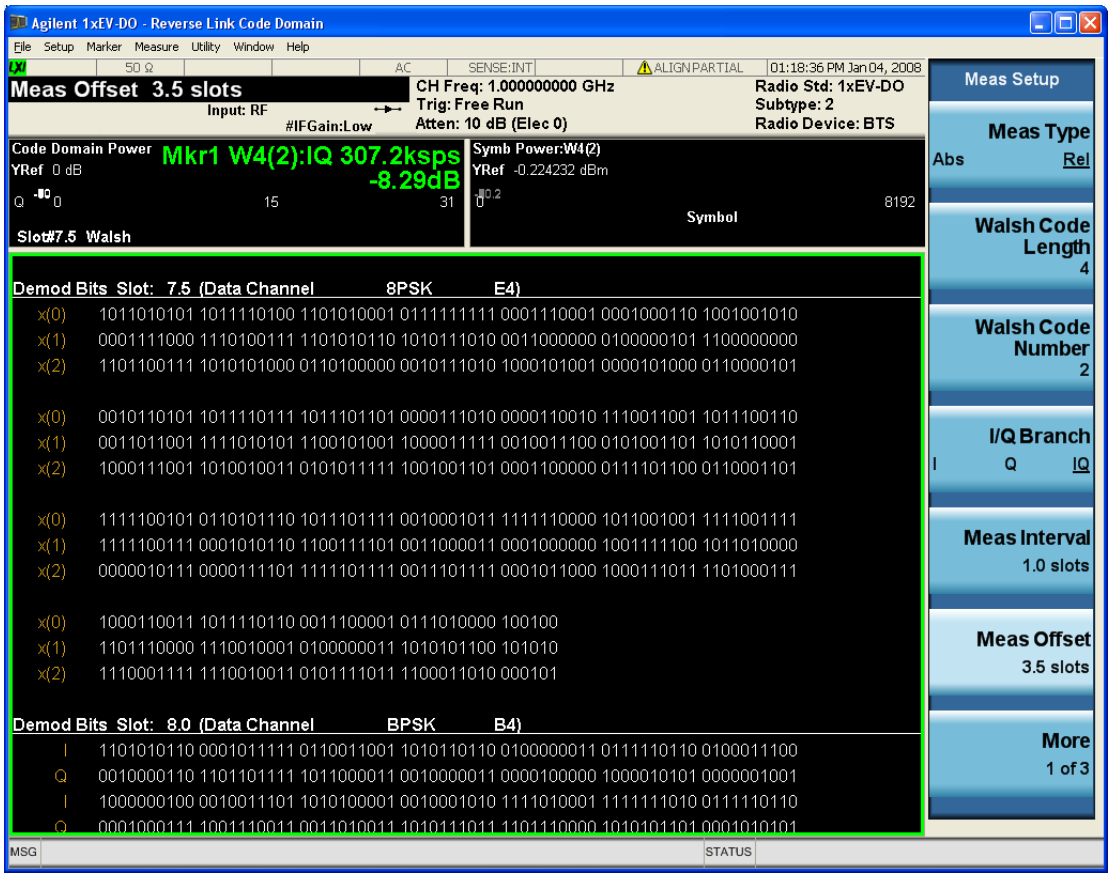


- E2 modulation format



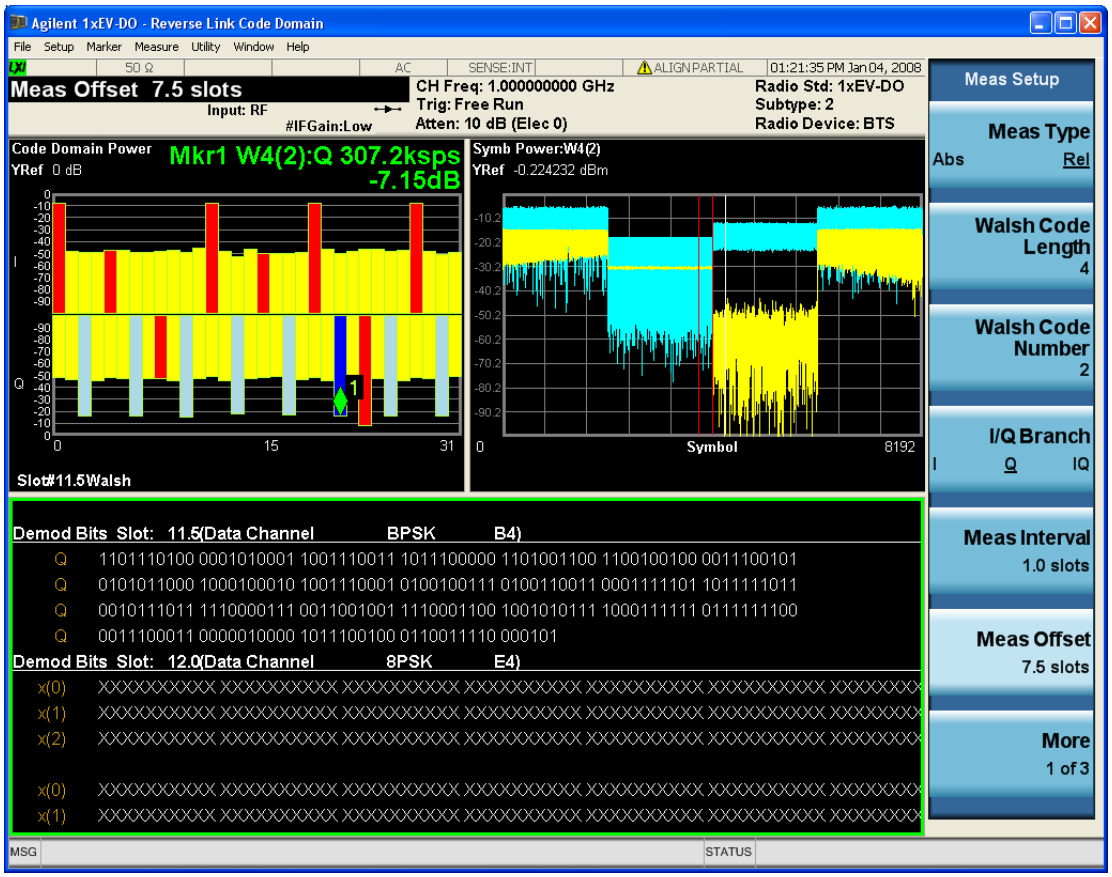
The modulation scheme can dynamically change in sub-frame boundary since 1xEV-DO reverse link support AMC (Adaptive Modulation and Coding). Therefore, correctly to demodulate AMC channel, it needs to detect the modulation scheme slot-by-slot. To support AMC, it returns Demod bits according to the modulation scheme dynamically changed. As a result, the bits data of different 'bit-per-symbols' could be mixed slot-by-slot.

The following figure is the demod bit window when the different modulation scheme is mixed. User knows the modulation scheme changed at Slot 15.5 and at Slot 0.



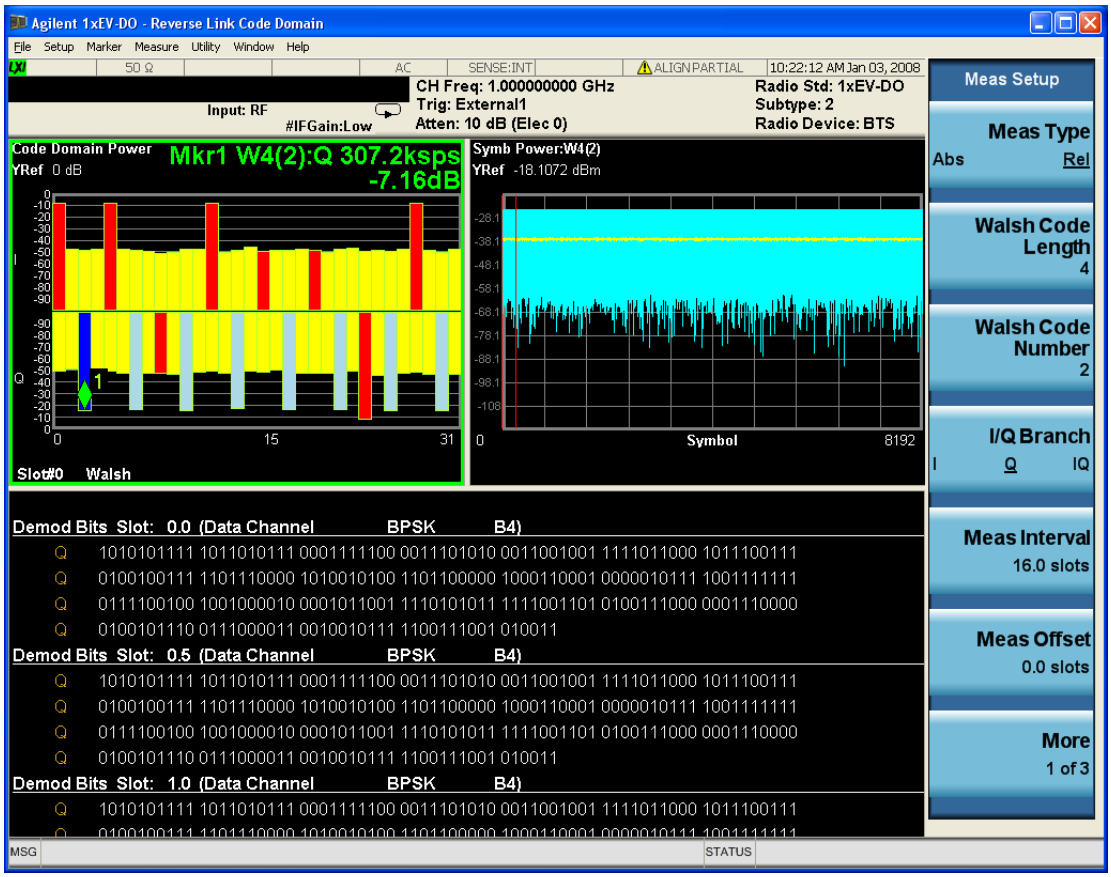
-DTX (Discontinuous Transmission) support

ACK channel code domain power repeats ON and OFF every half slot. This kind of transmission is called “DTX (Discontinuous Transmission)”. ON slot and OFF slot can detect automatically and the demod bit changes by following detected power. The demod bit with DTX represents “X” and distinguished from active part bit (0.0 and 1.0).

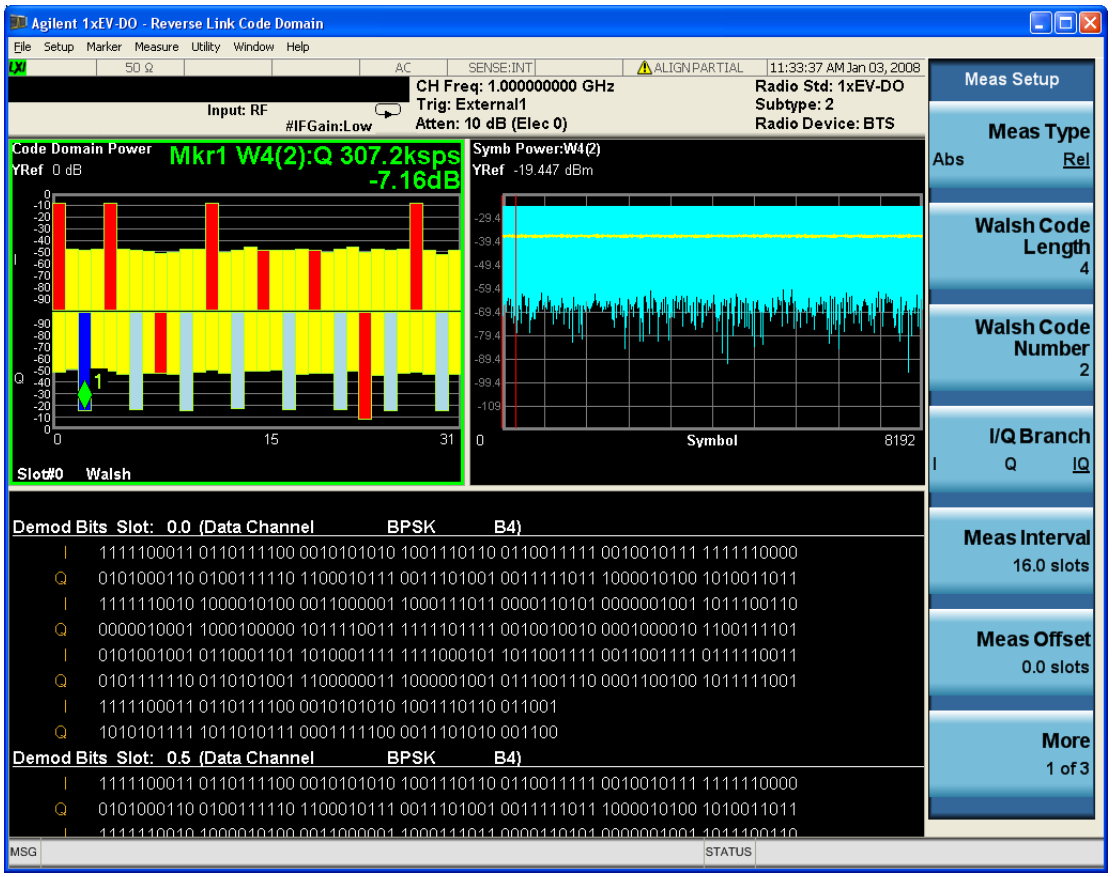


Changes in demod bit window with “I/Q Branch” key

1xEV-DO Reverse link Code domain measurement has “IQC” (I/Q Combined) parameter within “I/Q Branch” key. When “IQC” is selected, the representation of Demod bits window changes.



Branch changes between Q branch and IQC (IQ combined) branch



Power Bar Graph window

This trace is of the slot specified by the Meas Offset. (Not averaged through meas interval.)

Marker Operation	Yes
Corresponding Trace	CDPower (n=2)

Symbol/Chip Power window

This trace is of the slots specified by the Meas Offset and Meas Interval.

Marker Operation	Yes
Corresponding Trace	SPOWer (n=9), CPOWer (n=10)

Demod Bits window

This trace is of the slots specified by the Meas Offset and Meas Interval.

Marker Operation	
Corresponding Trace	(n=11)

If the Demod Bits window is active in the Demod Bits view (window), the View/Display key accesses the menu to allow the following controls to read the bit stream measurement results:

- Prev Page - Returns one page back to the previous page of the measurement results.
- Next Page - Moves one page forward to the next page of the measurement results.
- Scroll Up - Moves one line upward from the current page of the measurement results by each pressing.
- Scroll Down - Moves one line downward from the current page of the measurement results by each pressing.
- First Page - Moves from the current page to the first page of the measurement results.
- Last Page - Moves from the current page to the last page of the measurement results.

Example	DISP:CDP:MS:VIEW DBIT DISP:CDP:MS:VIEW?
Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	`:CALCulate:CDPower:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:CDPower:MS:WCODe:ORDer?`
Example	:CALC:CDP:MS:WCOD:ORD BREV
Notes	This key appears when Code Domain Power window is active.
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard | Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TCDPower:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggles the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker
Mode	1xEVDO

Remote Command	:DISPlay:CDPower:MS:MARKer:CONSolidated ON|OFF|1|0 :DISPlay:CDPower:MS:MARKer:CONSolidated?
Example	:DISPlay:CDPower:MS:MARKer:CONSolidated ON :DISPlay:CDPower:MS:MARKer:CONSolidated?
Notes	This soft key is displayed only when the CDP window is selected. This key is grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power. You must be in the 1xEVDO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	:DISPlay:TCDPower:MARKer:CONSolidated
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively.

Code Domain Power when I/Q Combined Power Bar is set to OFF.

Key Path	View/Display, Power Graph & Metrics
Mode	1xEV-DO
Remote Command	:CALCulate:CDPower:MS:IQ:COMBined[:STATe] 0|1|OFF|ON :CALCulate:CDPower:MS:IQ:COMBined[:STATe]?
Example	:CALC:CDP:MS:IQ:COMB ON :CALC:CDP:MS:IQ:COMB?
Notes	You must be in the 1xEV-DO mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	:CALCulate:TCDPower:IQ:COMBined[:STATe]
Initial S/W Revision	Prior to A.02.00

13 Reverse Link Mod Accuracy (Waveform Quality) Measurement

This measures the reverse link Modulation Accuracy of 1xEV-DO signal. You must be in the 1xEV-DO mode to use these commands.

This topic contains the following sections:

"Measurement Commands for Reverse Link Modulation Accuracy Measurement" on page 1824

"Remote Command Results for Reverse Link Modulation Accuracy Measurement" on page 1825

Measurement Commands for Reverse Link Modulation Accuracy Measurement

The following commands are used to retrieve the measurement results:

You must be in the 1xEV-DO mode to use these commands. Use INSTtument:SELect to set the mode.

NOTE: The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:RHO commands for more measurement related commands.

Remote Commands	Backwards Compatibility SCPI:
`:CONFigure:RHO:MS`	`:CONFigure:TRHO`
`:CONFigure:RHO:MS:NDEFault`	`:CONFigure:TRHO:NDEFault`
`:INITiate:RHO:MS`	`:INITiate:TRHO`
`:FETCh:RHO:MS[n]?`	`:FETCh:TRHO[n]?`
`:READ:RHO:MS[n]?`	`:READ:TRHO[n]?`
`:MEASure:RHO:MS[n]?`	`:MEASure:TRHO[n]?`

Remote Command Results for Reverse Link Modulation Accuracy Measurement

Index n	Result 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	Returns following 22 comma-separated scalar results, in the following order: #.Result Name (average mode) <explanations> average mode is: Average : Averaged value in average cycle Peak Hold : Detected Peak/Maximum value in average cycle 1. RMS EVM (Average) – a floating point number (in percent) of EVM over the entire measurement area. 2. Peak EVM (Peak Hold) – a floating point number (in percent) of peak EVM in the measurement area. 3. Magnitude error (Average) – a floating point number (in percent) of average magnitude error over the entire measurement area. 4. Phase error (Average) – a floating point number (in degree) of average phase error over the entire measurement area. 5. I/Q Origin Offset (Average) – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. Frequency error (Average) – a floating point number (in Hz) of the frequency error in the measured signal. 7. Rho (Average) – a floating point number of Rho. 8. Peak Code Domain Error (Peak Hold) – a floating point number (in dB) of the Peak Code Domain Error relative to the mean power 9. Peak Code Domain Error Channel Number (Peak Hold) – Returns the channel number that the peak is detected at the max spreading factor. (In MS, number = peak channel + (max spread number * (code == Q))). 10. Number of active channels(Average) 11. Pilot Offset (Average) – a floating point number (in micro seconds) of Pilot offset from the trigger point. 12. Max Inactive Channel Code Domain Power (Peak Hold) – a floating point number (in dB) of the Max Inactive Channel Code Domain Power 13. RRI Relative Power (Average) – a floating point number (in dB) of the RRI power relative to Pilot 14. DRC Channel Relative Power (Average) – a floating point number (in dB) of the DRC Channel Power relative to Pilot 15. ACK Channel Relative Power (Average) – a floating point number (in dB) of the ACK Channel Power relative to Pilot 16. Data Channel Relative Power (Average) – a floating point number (in dB) of summed up Data Channel Power relative to Pilot 17. (Reserved) – (always –999) 18. (Reserved) – (always –999) 19. Auxiliary Pilot Channel Relative Power (Average) – a floating point number (in dB) of Auxiliary Pilot Channel Power relative to Pilot 20. First Slot Number – a floating point number of first slot number. This is not averaged even if averaging in On. 21. Total Power (Average) – a floating point number in dBm of total RF power over a measurement slot.

	22. DSC Channel Relative Power (Average) – a floating point number (in dB) of the DSC Channel Power relative to Pilot
2	Returns series of floating point numbers (in percent) that represent each sample in the EVM trace of Capture Interval. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1xX, 2xX, 3xX... (X = the number of points per chip)
3	Returns series of floating point numbers (in percent) that represent each sample in the Magnitude error trace of Capture Interval. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1xX, 2xX, 3xX ... (X = the number of points per chip)
4	Returns series of floating point numbers (in degree) that represent each sample in the Phase error trace of Capture Interval. The first number is the symbol 0 decision point and there are X points per symbol. Therefore, the decision points are at 0, 1xX, 2xX, 3xX ... (X = the number of points per chip)
5	Returns series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace of a half slot specified Meas Offset. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there are X points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point ... (2xX)+1th number = I of the symbol 1 decision point (2xX)+2th number = Q of the symbol 1 decision point ... (2xX)xNth + 1 number = I of the symbol N decision point (2xX)xNth + 2 number = Q of the symbol N decision point (X = the number of points per chip)
6	Returns 13 comma-separated scalar values of the pass/fail (0.0=passed, or 1.0=failed) results determined by testing the following items. If Physical Layer is set to Subtype0/1, the result from 12th to 13th is always 0.0. 1. Test result of EVM (Average) 2. Test result of Peak EVM (Peak Hold) 3. Test result of Rho (Average) 4. Test result of Peak Code Domain Error (Peak Hold) 5. Test result of Frequency Error (Average) 6. Test result of Pilot Offset (Average) 7. Test result of Max Inactive channel Code Domain Power (Peak Hold) 8. Test result of RRI Relative power (Average) 9. Test result of ACK Channel Relative Power (Average) 10. Test result of DRC Channel Relative Power (Average) 11. Test result of Data Channel Relative Power (Average) 12. Test result of DSC Channel Relative Power (Average, Subtype2/3 only)

	13. Test result of Auxiliary Pilot Channel Relative Power (Average, Subtype2/3 only)
7	From Code Domain Power View Returns series of floating point numbers of symbol rate, walsh code number, I or Q phase, power level (in dB), code domain error (in dB), time offset (in sec) and phase offset (in rad) for each active channel on the half slot specified by Meas Offset. The total numbers of results are seven times of "Active channels". The number of active channels can be obtained by the 10th result of FETCh:TRHO11 command. The results would look like the following: 1st number = Symbol Rate for 1st Active Channel 2nd number = Walsh Code number for 1st Active Channel 3rd number = 1 (I phase) or –1 (Q phase) or 0 (I and Q phase) for 1st Active Channel 4th number = Power Level (in dB) for 1st Active Channel 5th number = Code Domain Error (in dB) for 1st Active Channel 6th number = Time Offset (in sec) for 1st Active Channel 7th number = Phase Offset (in rad) for 1st Active Channel . . . (N–1)*7+1 number = Symbol Rate for Nth Active Channel (N–1)*7+2 number = Walsh Code number for Nth Active Channel (N–1)*7+3 number = 1 (I phase) or –1 (Q phase) or 0 (I and Q phase) for Nth Active Channel (N–1)*7+4 number = Power Level (in dB) for Nth Active Channel (N–1)*7+5 number = Code Domain Error (in dB) for Nth Active Channel (N–1)*7+6 number = Time Offset (in sec) for Nth Active Channel N*7 number = Phase Offset (in rad) for Nth Active Channel
8	Returns a series of floating point numbers (in dB) that represents all the code domain powers. When I/Q Combined Power Bar is set to ON, total is 16 for Subtype 0/1, 32 for Subtype 2/3. If the active channel occupies more than the max spreading factor (16 for Subtype 0/1, 32 for Subtype 2/3) the power is duplicated. 1st number = 1st code power over a half slot specified Meas Offset 2nd number = 2nd code power over a half slot specified Meas Offset . . . Nth number = Nth code power over a half slot specified Meas Offset When I/Q combined Power Bar is set to OFF, code domain power results are returned alternatively. Total is 16 IQ pairs for Subtype 0/1, 32 IQ pairs for Subtype 2/3. If the active channel occupies more than max spreading factor (16 for Subtype 0/1, 32 for Subtype 2/3), the power is duplicated. 1st number = 1st In Phase code power over a half slot specified Meas Offset 2nd number = 1st Quad Phase code power over a half slot specified Meas Offset ... (2*N–1)th number = Nth In Phase code power over a half slot specified Meas Offset (2*N)th number = Nth Quad Phase code power over a half slot specified Meas Offset N = the number of codes detected. The total number of codes varies because of the different symbol rates of each code.

9	Average scalar results trace returns 31 comma-separated scalar results: 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 2. Peak EVM – a floating point number (in percent) of peak EVM in the measurement area. 3. Magnitude error - a floating point number (in percent) of average magnitude error over the entire measurement area. 4. Phase error– a floating point number (in degree) of average phase error over the entire measurement area. 5. I/Q Origin Offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 7. Rho – a floating point number of Rho. 8. Peak Code Domain Error – a floating point number (in dB) of the Peak Code Domain Error relative to the mean power 9. Peak Code Domain Error Channel Number – Returns the channel number that the peak is detected at the max spreading factor. (In MS, number = peak channel + (max spread number * (code == Q))). It always returns –999. 10. Number of active channels 11. Pilot Offset – a floating point number (in micro seconds) of Pilot offset from the trigger point. 12. Max Inactive Channel Code Domain Power – a floating point number (in dB) of the Max Inactive Channel Code Domain Power. It always returns –999. 13. Pilot Power – a floating point number (in dB) of the Pilot power 14. RRI Power – a floating point number (in dB) of the RRI power 15. RRI Relative Power – a floating point number (in dB) of the RRI power relative to Pilot 16. DRC Power – a floating point number (in dB) of the DRC power 17. DRC Channel Relative Power – a floating point number (in dB) of the DRC Channel Power relative to Pilot 18. ACK Power – a floating point number (in dB) of the ACK power 19. ACK Channel Relative Power – a floating point number (in dB) of the ACK Channel Power relative to Pilot 20. Data Power on – a floating point number (in dB) of summed up Data Channel Power 21. Data Channel Relative Power– a floating point number (in dB) of the summed up Data Channel Power relative to Pilot 22. (Reserved) – (always –999) 23. (Reserved) – (always –999) 24. (Reserved) – (always –999) 25. (Reserved) – (always –999) 26. Auxiliary Pilot Power – a floating point number (in dB) of the Auxiliary Pilot power 27. Auxiliary Pilot Channel Relative Power – a floating point number (in dB) of Auxiliary Pilot Channel Power relative to Pilot 28. Total Power – a floating point number in dBm of total RF power over a measurement slot. 29. Pilot & RRI Power – a floating point number (in dBc) of the Pilot & RRI power for Subtype 0/1 or –999 for Subtype2/3. 30. DSC Channel Power – a floating point number (in dBc) of the DSC Channel Power. 31. DSC Channel Relative Power – a floating point number (in dB) of the DSC Channel Power relative to Pilot.
10	Peak Hold scalar results trace returns 31 comma-separated scalar results: 1. RMS EVM – a floating point number (in percent) of EVM over the entire measurement area.

	2. Peak EVM – a floating point number (in percent) of peak EVM in the measurement area. 3. Magnitude error - a floating point number (in percent) of average magnitude error over the entire measurement area. 4. Phase error– a floating point number (in degree) of average phase error over the entire measurement area. 5. I/Q Origin Offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 7. Rho – a floating point number of Rho. 8. Peak Code Domain Error – a floating point number (in dB) of the Peak Code Domain Error relative to the mean power 9. Peak Code Domain Error Channel Number – Returns the channel number that the peak is detected at the max spreading factor. (In MS, number = peak channel + (max spread number * (code == Q))). 10. Number of active channels 11. Pilot Offset – a floating point number (in micro seconds) of Pilot offset from the trigger point. 12. Max Inactive Channel Code Domain Power – a floating point number (in dB) of the Max Inactive Channel Code Domain Power 13. Pilot Power – a floating point number (in dB) of the Pilot power 14. RRI Power – a floating point number (in dB) of the RRI power 15. RRI Relative Power – a floating point number (in dB) of the RRI power relative to Pilot 16. DRC Power – a floating point number (in dB) of the DRC power 17. DRC Channel Relative Power – a floating point number (in dB) of the DRC Channel Power relative to Pilot 18. ACK Power – a floating point number (in dB) of the ACK power 19. ACK Channel Relative Power – a floating point number (in dB) of the ACK Channel Power relative to Pilot 20. Data Power – a floating point number (in dB) of the summed up Data Channel Power 21. Data Channel Relative Power – a floating point number (in dB) of the summed up Data Channel Power relative to Pilot 22. (Reserved) – (always –999) 23. (Reserved) – (always –999) 24. (Reserved) – (always –999) 25. (Reserved) – (always –999) 26. Auxiliary Pilot Power – a floating point number (in dB) of the Auxiliary Pilot power 27. Auxiliary Pilot Channel Relative Power – a floating point number (in dB) of Auxiliary Pilot Channel Power relative to Pilot. 28. Total Power – a floating point number in dBm of total RF power over a measurement slot. 29. Pilot & RRI Power – a floating point number (in dBc) of the Pilot & RRI power for Subtype 0/1 or –999 for Subtype2/3. 30. DSC Channel Power – a floating point number (in dBc) of the DSC Channel Power. 31. DSC Channel Relative Power – a floating point number (in dB) of the DSC Channel Power relative to Pilot.
11	Meas Offset scalar results trace returns 12 comma-separated scalar results: 1. RMS EVM– a floating point number (in percent) of EVM on the half slot specified by Meas Offset. 2. Peak EVM– a floating point number (in percent) of peak EVM on the half slot specified by Meas Offset. 3. Magnitude error– a floating point number (in percent) of average magnitude error on the half slot specified by Meas Offset.

4. Phase error– a floating point number (in degree) of average phase error on the half slot specified by Meas Offset.

5. I/Q Origin Offset– a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin of the half slot specified by Meas Offset..

6. Frequency error– a floating point number (in Hz) of the frequency error on the half slot specified by Meas Offset.

7. Rho– a floating point number of Rho on the half slot specified by Meas Offset..

8. Peak Code Domain Error– a floating point number (in dB) of the Peak Code Domain Error relative to the mean power over the half slot specified by Meas Offset.

9. Peak Code Domain Error Channel Number– Returns the channel number that the peak is detected at the max spreading factor. (In MS, number = peak channel + (max spread number * (code == Q))).

10. Number of active channels- return the number of active channels on the half slot specified by Meas Offset.

11. Pilot Offset– a floating point number (in micro seconds) of Pilot offset from the trigger point.

12. Total Power– a floating point number in dBm of total RF power over the half slot specified by Meas Offset.

Key Path	Meas
Initial S/W Revision	Prior to A.02.00

Amplitude (AMPTD) Y Scale

Access a menu of functions that enable you to set the desired vertical scale parameters for the current measurement. The Metrics, I/Q Symbol Polar Vector, and Demod Bits windows do not support the functions in this menu. A blank menu will be displayed

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

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	`[: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	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECtrical | COMBined` `[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
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	`[:SENSe]:POWer[:RF]:RANGe:PARatio <real>` `[:SENSe]:POWer[:RF]:RANGe:PARatio?`
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

Y 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
Initial S/W Revision	Prior to A.02.00

Y Ref Value (I/Q Error (Quad) View, Magnitude Error window)

Sets the reference value in the Magnitude Error window.

Key Path	AMPTD Y Scale
Mode	1xEVDO

Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:Y:RLEV?
Notes	If 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. VIEW3: I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–500.0
Max	500.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

Y Ref Value (I/Q Error (Quad) View, Phase Error window)

Sets the reference value in the Phase Error window.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:Y:RLEV?
Notes	If 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. VIEW3: I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–36000.0
Max	36000.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:Y[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

Y Ref Value (I/Q Error (Quad) View, EVM window)

Sets the reference value in the EVM window.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:Y:RLEV?
Notes	If 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. VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–500.00
Max	500.00
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:Y[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

Y Ref Value (Code Domain Power View, Power Bar Graph window)

Sets the reference value in the Power Bar Graph window.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW4:WIND:TRAC:Y:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW4:Code Domain Power View
Couplings	See Restriction and Notes
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.00
Max	250.00

Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

Y Scale/Div

Sets the units per division of 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
Initial S/W Revision	Prior to A.02.00

Y Scale/Div (I/Q Error (Quad) view, Magnitude Error window)

Sets the vertical scale by changing a value per division in Magnitude Error window of I/Q Error View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:Y:PDIV?
Notes	If 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. VIEW3:I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	1.5
State Saved	Saved in instrument state.
Min	0.10
Max	50.00
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

Y Scale/Div (I/Q Error (Quad) view, Phase Error window)

Sets the vertical scale by changing a value per division in Phase Error window of I/Q Error View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:Y:PDIV?
Notes	If 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. VIEW3:I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	1.00
State Saved	Saved in instrument state.
Min	0.01
Max	3600.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:Y[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

Y Scale/Div (I/Q Error (Quad) view, EVM window)

Sets the vertical scale by changing a value per division in EVM window of I/Q Error View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:Y:PDIV?
Notes	If 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. VIEW3:I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	1.00
State Saved	Saved in instrument state.
Min	0.10
Max	50.00
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:Y[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

Y Scale/Div (Code Domain Power view, Power Bar Graph window)

Sets the vertical scale by changing a power value per division in the Power Bar Graph window of Code Domain Power View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW4:WIND:TRAC:Y:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW4 : Code Domain Power View
Couplings	See Restriction and Notes
Preset	10.0
State Saved	Saved in instrument state.
Min	0.010
Max	20.00
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

Y Ref Position

Positions the Y-axis scale reference level at the top, center or bottom of the display. Changing the reference position does not change the reference level value.

Key Path	AMPTD Y Scale
Initial S/W Revision	Prior to A.02.00

Y Ref Position (I/Q Error (Quad View) view, Magnitude Error window)

Sets the reference position of the Y axis in Magnitude Error view of I/Q Error (Quad View) view.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTer | BOTTom` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`

Example	DISP:RHO:MS:VIEW3:WIND:TRAC:Y:RPOS CENT
Notes	VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Preset	CENT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

Y Ref Position (I/Q Error (Quad View) view, Phase Error window)

Sets the reference position of the Y axis in Phase Error view of I/Q Error (Quad View) view.

Key Path	AMPTD Y Scale
Mode	1XEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP | CENTer | BOTTom` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:Y:RPOS CENT
Notes	VIEW3 : I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Preset	CENT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:Y[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

Y Ref Position (I/Q Error (Quad View) view, EVM window)

Sets the reference position of the Y axis in EVM view of I/Q Error (Quad View) view.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:RPOSition TOP | CENTer | BOTTom` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:Y:RPOS CENT

Notes	VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Preset	BOTT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:Y[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the Restart front panel key or Restart menu key under the Meas Control menu is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

Key Path	AMPTD Y Scale
Initial S/W Revision	Prior to A.02.00

Y Auto Scaling (I/Q Error (Quad View) view, Magnitude Error window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in Magnitude Error window of I/Q Error (Quad View) View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND1:TRAC:Y:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:Y[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Y Auto Scaling (I/Q Error (Quad View) view, Phase Error window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in Phase Error window of I/Q Error (Quad View) View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:Y:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:Y[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Y Auto Scaling (I/Q Error (Quad View) view, EVM window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in EVM window of I/Q Error (Quad View) View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:Y:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On

Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:Y[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

Y Auto Scaling (Code Domain Power view, Power Bar Graph window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in Power bar graph window of Code Domain Power View.

Key Path	AMPTD Y Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW4:WIND1:TRAC:Y:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW4: Code Domain Power View WIND: Code Domain Power Window in Code Domain Power View
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:Y[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

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 keyactions 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 1843

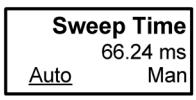
Key Path	Front-panel key
Remote Command	`:COUPle ALL|NONE`
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not 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

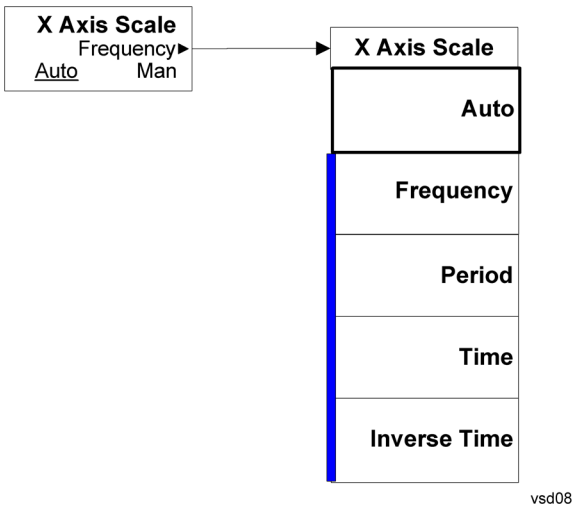
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making 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.


X Axis Scale
Frequency
Auto
Man
X Axis Scale
Auto
Frequency
Period
Time
Inverse Time
vsd08

BW

There is no BW functionality supported in the Modulation Accuracy measurement. The front-panel key will display a blank menu when key pressed.

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

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.

File

See "File" on page 224

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 1852

See Ext Mix Center Freq

See "I/Q Center Freq" on page 1854

See "Center Frequency Presets" on page 1850

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 1850 and "RF Center Freq" on page 1852 and Ext Mix Center Freq and "I/Q Center Freq" on page 1854.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1850 and "RF Center Freq" on page 1852 and "I/Q Center Freq" on page 1854.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 1850 and "RF Center Freq" on page 1852 and "I/Q Center Freq" on page 1854.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
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
504 (M9420A)	1 GHz	3.8GHz	3.88 GHz
506 (M9420A)	1 GHz	6.0GHz	6.08 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 while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) 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	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 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

Input/Output

See "Input/Output" on page 176

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Contained within this menu is a 1-of-N selection of the control mode (Normal, Delta, Off) for the selected marker.

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

Select Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Marker, Properties
Initial S/W Revision	Prior to A.02.00

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 symbol value at I/Q Symbol 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 will display the marker value to its full entered precision.

Key Path	Marker
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MODE POSition|DELTa|OFF` `:CALCulate:RHO:MS:MARKer[1]|2|...12:MODE?`
Example	CALC:RHO:MS:MARK:MODE POS CALC:RHO:MS: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: Marker symbol value at I/Q Symbol Polar Vector graph Marker X-axis value at other graphs the marker X axis value entered in the active function area will display 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

Properties

Accesses a menu that enables you to select a relative marker and marker trace.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

Select Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Marker, Properties
Initial S/W Revision	Prior to A.02.00

Relative TO

Selects the marker the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:REFerence <integer>` `:CALCulate:RHO:MS:MARKer[1]|2|...12:REFerence?`
Example	CALC:RHO:MS:MARK:REF 4 CALC:RHO:MS:MARK:REF?
Notes	When queried a single value will be returned (the specified marker numbers relative marker). 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.”
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

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:TRACe EVM | MERRor | PERRor | CDPower | POLar` `:CALCulate:RHO:MS:MARKer[1]|2|...12:TRACe?`
Example	CALC:RHO:MS:MARK:TRACE CDP CALC:RHO:MS:MARK:TRACE?
Preset	EVM
State Saved	Saved in instrument state.
Range	EVM | Phase Error | Mag Error | Code Domain Power | Polar
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:TRACe`
Initial S/W Revision	Prior to A.02.00

Couple Marker

Toggles the state of the markers to be coupled On or Off. When this function is true, moving any marker causes an equal X Axis movement of every other marker which 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).

Key Path	Marker
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:RHO:MS:MARKer:COUPle[:STATe]?`
Example	CALC:RHO:MS:MARK:COUP ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Initial S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	Marker
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer:AOFF`
Example	CALC:RHO:MS:MARK:AOFF
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer:AOFF`
Initial S/W Revision	Prior to A.02.00

Marker Chip Value (Remote Command only)

Sets the marker Chip value in the current marker for the I/Q Polar trace. It has no effect if the control mode is Off, but if the control mode is Normal, this is the SCPI equivalent of entering a Chip value.

This command is valid only when Marker Trace 'POLar'(I/Q Polar)is active. For any other Marker Trace, the command is ignored.

Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:CHIP <real>` `:CALCulate:RHO:MS:MARKer[1]|2|...12:CHIP?`
Example	CALC:RHO:MS:MARK:CHIP 0 CALC:RHO:MS:MARK:CHIP?
Notes	If no suffix is sent, 'chips' will be used. If a suffix is sent that does not match 'chips', an error "Invalid suffix" will be generated. The query returns the marker's 'chips' value in the trace if the control mode is Normal The query is returned in 'chips'. If the marker is Off the response is not a number (NAN). This parameter has different meanings when the marker trace is set to I/Q Polar and others cases. In the case of the I/Q Polar Graph, the X Axis Value is also the measured value, so this parameter is meaningful only when the control mode is set to Normal.
Preset	Start point of the trace in the display window
State Saved	No
Min	-9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

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	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:X <real>` `:CALCulate:RHO:MS:MARKer[1]|2|...12:X?`
Example	CALC:RHO:MS:MARK3:X 0.0 CALC:RHO:MS:MARK3:X?
Notes	The marker X Axis value has no unit suffix. For capture time data trace, the unit is second. 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 without unit suffix.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:X`
Initial S/W Revision	Prior to A.02.00

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 - 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	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:X:POSition <real>` `:CALCulate:RHO:MS:MARKer[1]|2|...12:X:POSition?`
Example	CALC:RHO:MS:MARK10:X:POS 0.0 CALC:RHO:MS:MARK10:X:POS?
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:X:POSition`
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:Y?`
Example	CALC:RHO:MS:MARK11:Y?
Preset	Result dependant on markers setup and signal source
State Saved	No
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:Y`
Initial S/W Revision	Prior to A.02.00

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	CDMA1XEV
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:STATe OFF|ON|0|1` `:CALCulate:RHO:MS:MARKer[1]|2|...12:STATe?`
Example	CALC:RHO:MS:MARK3:STATe ON CALC:RHO:MS:MARK3:STAT?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:STATe`
Initial S/W Revision	Prior to A.02.00

Marker Fctn

There are no Marker Function operations supported in the Modulation Accuracy measurement. The front-panel key will display a blank menu when pressed.

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

Marker To

There are no Marker To operations supported in the Mod Accuracy measurement. The front-panel key will display a blank 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.**

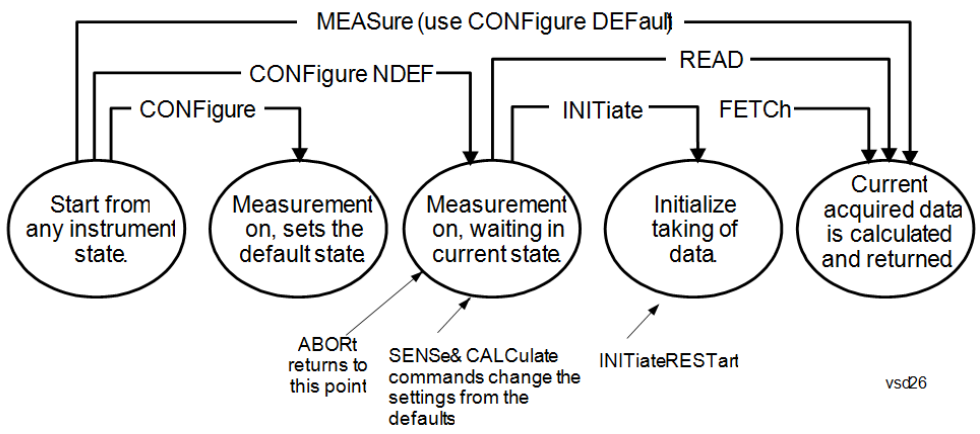
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

Remote Measurement Functions

This section contains the following topics:

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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} Xi$$

where Xi 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)

$$\text{MEAN} = \frac{1}{n} \sum_{Xi \in \text{region(s)}} |Xi|$$

where |Xi| 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)

$$DME = 10 \times \log_{10}\left(\frac{1}{n}\sum_{Xi \in \text{region(s)}} 10^{\frac{Xi}{10}}\right)$$

- 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi^2}$$

where Xi 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)

$$RMS = \sqrt{\frac{1}{n}\sum_{Xi \in \text{region(s)}} Xi\ Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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)

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (Xi - \overline{X})^2}$$

where Xi is a data point value, 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).

$$SDEV = \sqrt{\frac{1}{n} \sum_{Xi \in region(s)} (|Xi| - \overline{X})^2}$$

where |Xi| is the magnitude of an I/Q pair, 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:

  Power = 10 x log [10 x (RMS I/Q value)] + 10.

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{Xi \in region} Xi \, Xi^*}$$

where Xi is the complex value representation of an I/Q pair, Xi* 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:

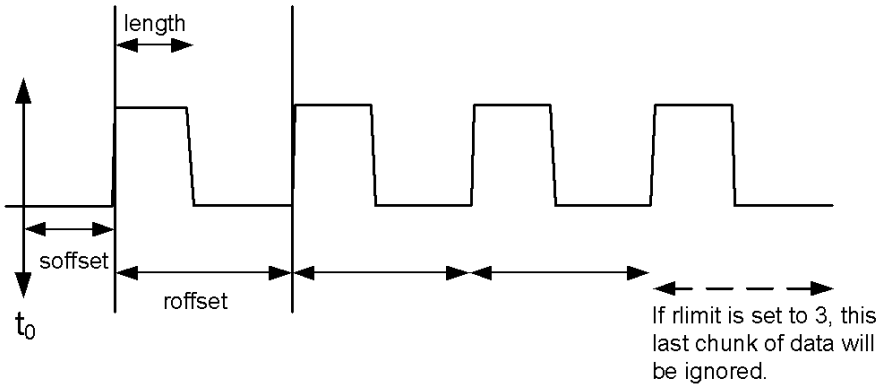
$$\frac{1}{n} \sum_{Yi \in region} Yi$$

where Yi 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.

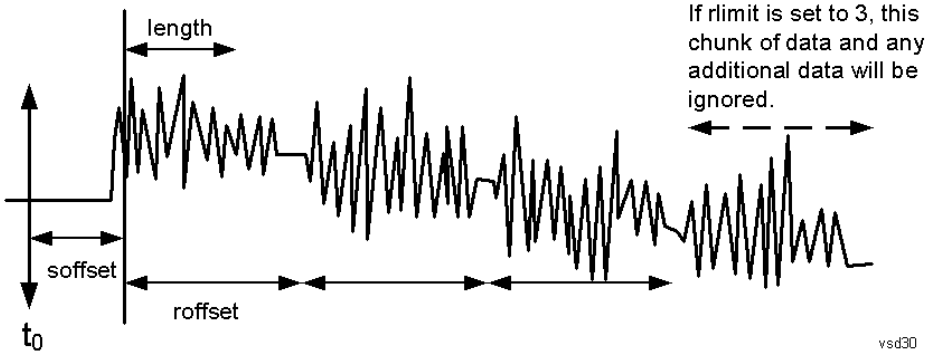
Sample Trace Data - Constant Envelope

(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	For Swept SA measurement:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME[,ALL | GTDLine | LTDLine]]`
	For most other measurements:
	`:CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>,<excursion>[,AMPLitude | FREQuency | TIME]`

Example	Example for Swept SA measurement in Spectrum Analyzer Mode: 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. Query Results 1: 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). If no peaks are found the peak list will consist of only the number of peaks, (0).
Notes	<n> - is the trace that will be used <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. <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

	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 reportedSorting 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 peforming 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	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. 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. 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.
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	Option EA3 is required. The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps). Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.
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	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) 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) 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 OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent 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	[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	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
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

Mode	All
Remote Command	`:CALCulate:FPOWer:POWer[1,2,…,999]:DEFine?`
E	:CALC:FPOW:POW1:DEF?

xample	
Notes	This command query is used to retrieve a list of all defined parameters in an ASCII format. The following is an example of the returned results: "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,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"
Initial S/W Revision	A.14.00

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.

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

Avg/Hold Number

Sets the number of data acquisitions that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Key Path	Meas Setup
Mode	1xEVDO

Remote Command	`[:SENSe]:RHO:MS:AVERage:COUNt <integer>`
	`[:SENSe]:RHO:MS:AVERage:COUNt?`
	`[:SENSe]:RHO:MS:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:RHO:MS:AVERage[:STATe]?`

Example	:RHO:MS:AVER:COUN 15 :RHO:MS:AVER OFF
Notes	Turn averaging on or off.
Preset	10 ON
State Saved	Saved in instrument state.
Range	1 to 10000
Min	1
Max	10000
Backwards Compatibility SCPI	`[:SENSe]:TRHO:AVERage:COUNt`
Initial S/W Revision	Prior to A.02.00

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.

KEYExponential averaging SCPIEXPonential	When Measure is set at Cont, data acquisitions will 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.

KEYRepeat averaging SCPIREPeat	When Measure is set at Cont, data acquisitions will 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	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:RHO:MS:AVERage:TCONtrol?`
Example	:RHO:MS:AVER:TCON EXP
Preset	EXP
State Saved	Saved in instrument state.
Range	Exp | Repeat
Backwards Compatibility SCPI	`[:SENSe]:TRHO:AVERage:TCONtrol`
Initial S/W Revision	Prior to A.02.00

Avg Slots

Selects the averaging slots within capture length. In Mod Accuracy measurement, Capture length is 1 slot. This setting can switch the results in Peak/Avg Metrics view. The result in I/Q Measured Polar Graph view, I/Q Error view and Code Domain Power view is a snapshot with selected slots by Meas Offset. If Meas Offset is set to 0, the user can see the result with first half slot in these views.

Key Path	Meas Setup
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:AVERage:SLOT HS1|HS2|FS` `[:SENSe]:RHO:MS:AVERage:SLOT?`
Example	:RHO:MS:AVER:SLOT FS
Preset	HS1
State Saved	Saved in instrument state.
Range	1st Half Slot | 2nd Half Slot | full slot
Backwards Compatibility SCPI	`[:SENSe]:TRHO:AVERage:SLOT`
Initial S/W Revision	Prior to A.02.00

Peak/Avg Metrics

Provides a table of magnitude error, phase error, EVM, and the modulation accuracy summary data such as rho, peak and rms EVM, peak Modulation Accuracy (Rho) error, magnitude error, phase error, and so forth in a text window, in terms of averaged and detected peak/maximum value in the average cycle.

- Average : The value averaged in average cycle
- Peak Hold : The value detected and hold as Peak/Maximum in average cycle

In this view, “F” shows failure to setting limit.

Example	:DISP:RHO:MS:VIEW TABL
Initial S/W Revision	Prior to A.02.00

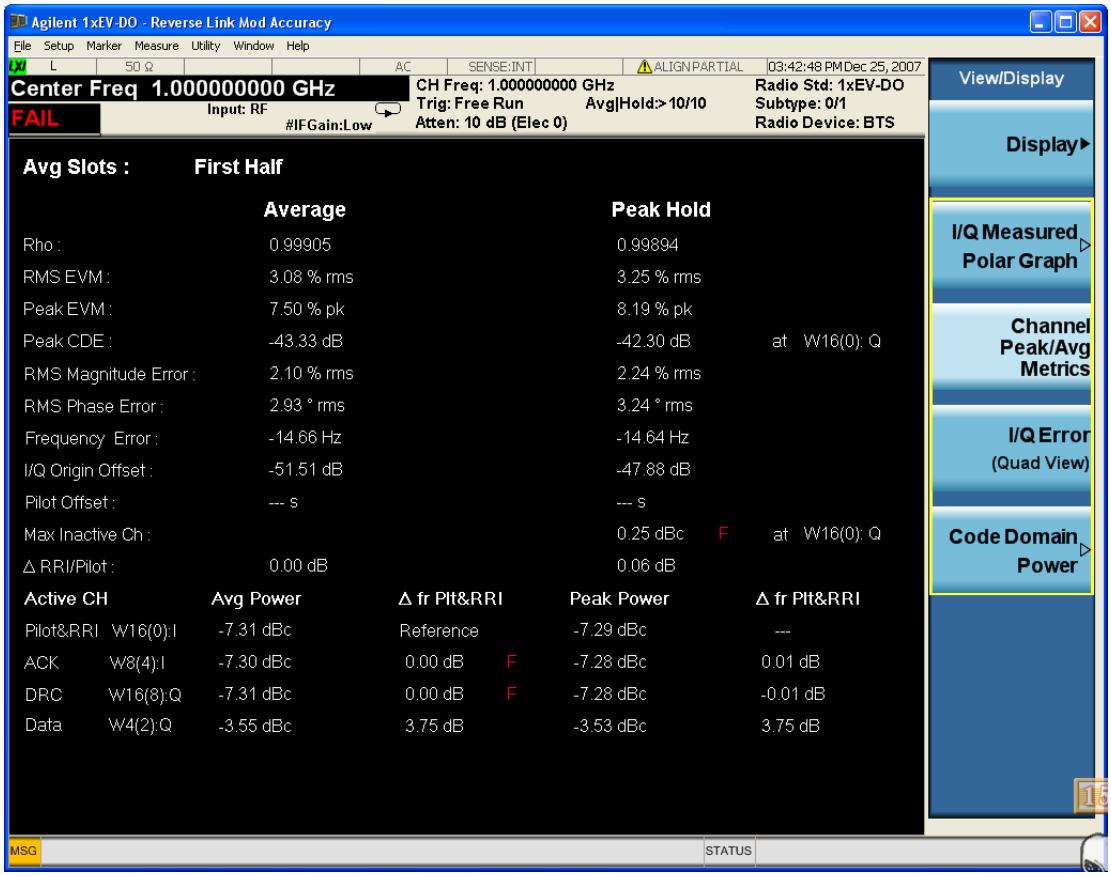


Figure 0-2 Peak/Avg Metrics View(Subtype0/1)

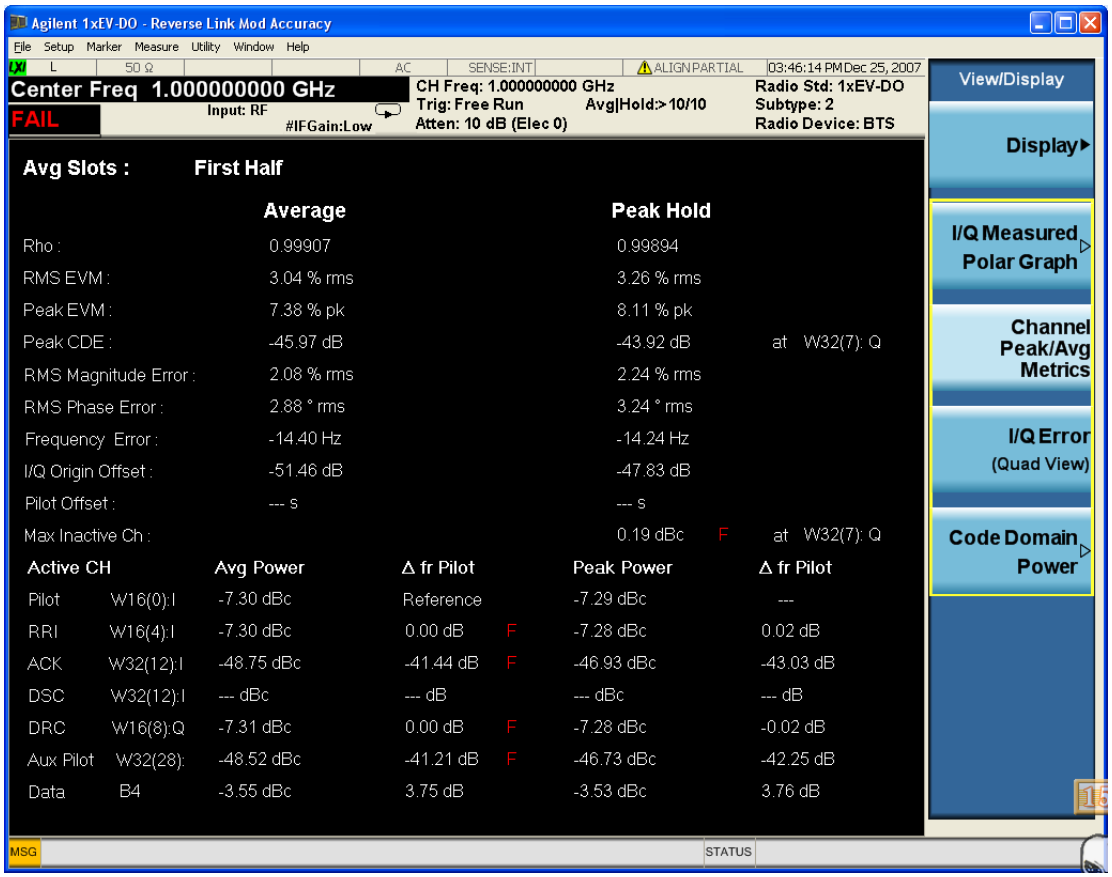


Figure 0-3 Peak/Avg Metrics View(Subtype2/3)

Parameter Name	Corresponding Results	Display Format
Rho	n=1 7th and n=9 7th (Average) n=10 7th (Peak Hold) rho	9.99999
RMS EVM	n=1 1st and n=9 1st (Average) n=10 1st (Peak Hold) EVM over the entire measurement area	99.99 %
Peak EVM	n=9 2nd (Average) n=1 2nd and n=10 2nd (Peak Hold) Peak EVM in the measurement area	99.99 %
Peak CDE	n=9 8th (Average) n=1 8th and n=10 8th (Peak Hold) Peak Code Domain Error relative to the mean power	99.99 dB
Pk CDE (Ch No.)	n=1 9th and n=10 9th The channel number in which the peak code domain error is detected.	WX(Y):Phase X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps

		Y: Walsh code number (0 .. X–1) Phase: I or Q
RMS Magnitude Error	n=1 3rd and n=9 3rd (Average) n=10 3rd (Peak Hold) Magnitude error over the entire measurement area	99.99 % rms
RMS Phase Error	n=1 4th and n=9 4th (Average) n=10 4th (Peak Hold) Phase error over the entire measurement area	99.99 °rms
Freq Error	n=1 6th and n=9 6th (Average) n=10 6th (Peak Hold) Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=1 5th and n=9 5th (Average) n=10 5th (Peak Hold) I and Q error (magnitude squared) offset from the origin	99.99 dB
Pilot Offset	n=1 11th and n=9 11th (Average) n=10 11th (Peak Hold) Pilot phase timing from the acquisition trigger point.	9999.99 us
Max Inactive Ch (dB)	n=1 12th and n=10 12th Max Inactive Code Domain power	99.99 dBc
Pilot & RRI Power (Subtype 0/1)	n=9 29th (Average) n=10 29th (Peak Hold) Pilot Power	99.99 dB
Pilot Power (Subtype 2/3)	n=9 13th (Average) n=10 13th (Peak Hold) Pilot Power	99.99 dB
RRI Channel Power	n=9 14th (Average) n=10 14th (Peak Hold) RRI Channel Power	99.99 dB
ΔRRI/Pilot (Subtype 0/1)	n=1 13th and n=9 15th (Average) n=10 15th (Peak Hold) RRI ch relative power to Pilot Ch	99.99 dB
RRI Channel Relative Power to Pilot (Subtype 2/3)	n=1 13th and n=9 15th (Average) n=10 15th (Peak Hold) RRI ch relative power to Pilot Ch	99.99 dB
ACK Channel Power	n=9 18th (Average) n=10 18th (Peak Hold) ACK Channel Power	99.99 dB

ACK Channel Relative Power to Pilot	n=1 14th and n=9 19th (Average) n=10 19th (Peak Hold) ACK ch relative power to Pilot Ch	99.99 dB
DSC Channel Power	n=9 30th (Average) n=10 30th (Peak Hold) DSC Channel Power	99.99 dB
DSC Channel Relative Power to Pilot	n=1 22nd and n=9 31st (Average) n=10 31st (Peak Hold) DSC ch relative power to Pilot Ch	99.99 dB
DRC Channel Power	n=9 16th (Average) n=10 16th (Peak Hold) DRC Channel Power	99.99 dB
DRC Channel Relative Power to Pilot	n=1 15th and n=9 17th (Average) n=10 17th (Peak Hold) DRC ch relative power to Pilot Ch	99.99 dB
Data Channel Power (W4 (2))	n=9 20th (Average) n=10 20th (Peak Hold) DataChannel Power on W4(2)	99.99 dB
Data Channel Relative Power (W4(2))to Pilot	n=1 16th and n=9 21st (Average) n=10 21st (Peak Hold) Data ch relative power on W4(2) to Pilot Ch	99.99 dB
Data Channel Power (W2 (1))	n=9 20th (Average) n=10 20th (Peak Hold) Data Channel Power on W2(1)	99.99 dB
Data Channel Relative Power (W2(1))to Pilot	n=1 16th and n=9 21st (Average) n=10 21st (Peak Hold) Data ch relative power on W2(1)to Pilot Ch	99.99 dB
Auxiliary Pilot Channel Power	n=9 26th (Average) n=10 26th (Peak Hold) Auxiliary Pilot Channel Power	99.99 dB
Auxiliary Pilot Channel Relative Power to Pilot	n=1 19th and n=9 27th (Average) n=10 27th (Peak Hold) Auxiliary Pilot ch relative power to Pilot Ch	99.99 dB

RMS EVM (Composite) [Subtype 0/1]

Sets the limit for composite RMS EVM measurement result with Subtype 0/1.

Key Path	Meas Setup, Limits

Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:RMS[:SUB0] <real> :CALCulate:RHO:MS:LIMit:RMS[:SUB0]?
Example	:CALC:RHO:MS:LIM:RMS 25
Preset	50
State Saved	Saved in instrument state.
Range	0 to 100
Min	0.0
Max	100
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:RMS[:SUB0]
Initial S/W Revision	Prior to A.02.00

Peak EVM (Composite) [Subtype 0/1]

Sets the limit for composite peak EVM measurement result with Subtype 0/1

Key Path	Meas Setup, Limits
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:PEAK[:SUB0] <real> :CALCulate:RHO:MS:LIMit:PEAK[:SUB0]?
Example	:CALC:RHO:MS:LIM:PEAK 125
Preset	100
State Saved	Saved in instrument state.
Range	0 to 200
Min	0.0
Max	200
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:PEAK[:SUB0]
Initial S/W Revision	Prior to A.02.00

Rho (Composite) [Subtype 0/1]

Sets the limit for composite Rho measurement result with Subtype 0/1.

Key Path	Meas Setup, Limits
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:RHO[:SUB0] <real> :CALCulate:RHO:MS:LIMit:RHO[:SUB0]?

Example	:CALC:RHO:MS:LIM:RHO 0.955
Preset	0.94400
State Saved	Saved in instrument state.
Range	0 to 1
Min	0
Max	1
Backwards Compatibility SCPI	`:CALCulate:TRHO:LIMit:RHO[:SUB0]`
Initial S/W Revision	Prior to A.02.00

Peak Code Domain Error [Subtype 0/1]

Sets the Peak Code Domain Error limit in dB with Subtype 0/1.

Key Path	Meas Setup, Limits
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:LIMit:CDERror[:SUB0] <real>` `:CALCulate:RHO:MS:LIMit:CDERror[:SUB0]?`
Example	:CALC:RHO:MS:LIM:CDER –20
Preset	0.0
State Saved	Saved in instrument state.
Range	–100 to 0
Min	–100
Max	0
Backwards Compatibility SCPI	`:CALCulate:TRHO:LIMit:CDERror[:SUB0]`
Initial S/W Revision	Prior to A.02.00

Frequency Error [Subtype 0/1]

Sets the Frequency Error limit with Subtype 0/1.

Key Path	Meas Setup, Limits
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:LIMit:FERRor[:SUB0] <real>` `:CALCulate:RHO:MS:LIMit:FERRor[:SUB0]?`
Example	:CALC:RHO:MS:LIM:FERR 500
Preset	300

State Saved	Saved in instrument state.
Range	0 Hz to 10kHz
Min	0
Max	10000
Backwards Compatibility SCPI	`:CALCulate:TRHO:LIMit:FERRor[:SUB0]`
Initial S/W Revision	Prior to A.02.00

Pilot Offset [Subtype 0/1]

Sets the limit for pilot offset time from the trigger timing with Subtype 0/1.

Key Path	Meas Setup, Limits
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:LIMit:POFFset[:SUB0] <real>` `:CALCulate:RHO:MS:LIMit:POFFset[:SUB0]?`
Example	:CALC:RHO:MS:LIM:POFF 0.2us
Preset	1 us
State Saved	Saved in instrument state.
Range	0 to 100.0 ms
Min	0
Max	0.1
Backwards Compatibility SCPI	`:CALCulate:TRHO:LIMit:POFFset[:SUB0]`
Initial S/W Revision	Prior to A.02.00

Inactive CDP [Subtype 0/1]

Sets the limit for inactive channel code domain power measurement result with Subtype 0/1.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:LIMit:ICDPower[:SUB0] <real>` `:CALCulate:RHO:MS:LIMit:ICDPower[:SUB0]?`
Example	:CALC:RHO:MS:LIM:ICDP –30
Preset	–23
State Saved	Saved in instrument state.
Range	–100 to 0

Min	–100
Max	0
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:ICDPower[:SUB0]
Initial S/W Revision	Prior to A.02.00

RRI/Pilot Power Tolerance [Subtype 0/1]

Sets the tolerance for RRI (reverse rate indicator) and pilot power ratio measurement result for Subtype 0/1.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:RRI[:SUB0] <real> :CALCulate:RHO:MS:LIMit:RRI[:SUB0]?
Example	:CALC:RHO:MS:LIM:RRI 0.35
Preset	0.25
State Saved	Saved in instrument state.
Range	0 dB to 3.00 dB
Min	0
Max	3.00
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:RRI[:SUB0]
Initial S/W Revision	Prior to A.02.00

Active CDP Tolerance [Subtype 0/1]

Sets the tolerance for each active code domain power level with its channel gain defined by DRC Chan Gain, ACK Chan Gain, or Data Chan Gain, respectively for Subtype 0/1. The range is 0.00 to 3.00 dB.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:ACDPower[:SUB0] <real> :CALCulate:RHO:MS:LIMit:ACDPower[:SUB0]?
Example	:CALC:RHO:MS:LIM:ACDP 0.35
Preset	0.25
State Saved	Saved in instrument state.
Range	0 dB to 3.00 dB
Min	0

Max	3.00
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:ACDPower[:SUB0]
Initial S/W Revision	Prior to A.02.00

DRC Channel Gain [Subtype 0/1]

Sets the power gain level of the DRC (data rate control) channel relative to the pilot channel power level for Subtype 0/1.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:DRC:GAIN[:SUB0] <real> :CALCulate:RHO:MS:LIMit:DRC:GAIN[:SUB0]?
Example	:CALC:RHO:MS:LIM:DRC:GAIN 4.2
Preset	3 dB
State Saved	Saved in instrument state.
Range	–10 dB to 10 dB
Min	–10
Max	10
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:DRC:GAIN[:SUB0]
Initial S/W Revision	Prior to A.02.00

ACK Channel Gain [Subtype 0/1]

Setsthe power gain level of the ACK (acknowledge) channel relative to the pilot channel power level for Subtype 0/1. The range is –10.00 to 10.00 dB.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:ACK:GAIN[:SUB0] <real> :CALCulate:RHO:MS:LIMit:ACK:GAIN[:SUB0]?
Example	:CALC:RHO:MS:LIM:ACK:GAIN 4.2
Preset	3
State Saved	Saved in instrument state.
Range	–10 dB to 10 dB
Min	–10
Max	10

Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:ACK:GAIN[:SUB0]
Initial S/W Revision	Prior to A.02.00

Data Channel Gain [Subtype 0/1]

Sets the power gain level of the data channel relative to the pilot channel power level for Subtype 0/1. The range is 0 to 20.00 dB.

Key Path	Meas Setup, Limits, More 1 of 2
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:LIMit:DATA:GAIN[:SUB0] <real> :CALCulate:RHO:MS:LIMit:DATA:GAIN[:SUB0]?
Example	:CALC:RHO:MS:LIM:DATA:GAIN 4.2
Preset	3.75
State Saved	Saved in instrument state.
Range	0 dB to 20 dB
Min	0
Max	20
Backwards Compatibility SCPI	:CALCulate:TRHO:LIMit:DATA:GAIN[:SUB0]
Initial S/W Revision	Prior to A.02.00

Meas Offset

Sets the number of offset slots to make a symbol power measurement.

Key Path	Meas Setup
Mode	1xEVDO
Remote Command	:CALCulate:RHO:MS:SWEep:OFFSet <integer> :CALCulate:RHO:MS:SWEep:OFFSet?
Example	:CALC:RHO:MS:SWE:OFFS 0.5
Preset	0.0
State Saved	Saved in instrument state.
Range	0.0 to 0.5
Min	0.0
Max	0.5
Backwards Compatibility SCPI	:CALCulate:TRHO:SWEep:OFFSet
Initial S/W Revision	Prior to A.02.00

Sync Type

Select the sync type, pilot or auxiliary pilot.

Key Path	Meas Setup, more 1 of 3
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:SYNC PILot|APILot` `[:SENSe]:RHO:MS:SYNC?`
Example	:RHO:MS:SYNC APIL
Notes	It is active when subtype is 2.
Preset	PILot
State Saved	Saved in instrument state.
Range	Pilot | Aux Pilot
Initial S/W Revision	Prior to A.02.00

I Long Code Mask

Sets the Long Code Mask value for I axis.

Key Path	Meas Setup, More 1 of 3
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:SYNC:ILCMask <long_integer>` `[:SENSe]:RHO:MS:SYNC:ILCMask?`
Example	:RHO:MS:SYNC:ILCM 1
Preset	00000000000
State Saved	Saved in instrument state.
Range	00000000000 to 4398046511103
Min	00000000000
Max	4398046511103
Backwards Compatibility SCPI	`[:SENSe]:TRHO:SYNC:ILCMask`
Initial S/W Revision	Prior to A.02.00

Q Long Code Mask

Sets the Long Code Mask value for Q axis.

Key Path	Meas Setup, More 1 of 3

Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:SYNC:QLCMask <long_integer>` `[:SENSe]:RHO:MS:SYNC:QLCMask?`
Example	:RHO:MS:SYNC:QLCM 1
Preset	00000000000
State Saved	Saved in instrument state.
Range	00000000000 to 4398046511103
Min	00000000000
Max	4398046511103
Backwards Compatibility SCPI	`[:SENSe]:TRHO:SYNC:QLCMask`
Initial S/W Revision	Prior to A.02.00

Active Code Chan

This menu controls the function to identify which code channels are active:

Auto (Auto Active Channel Detection) - allows the instrument to determine Active Channels automatically. Due to algorithm limitation, when the power level is unstable, Auto performance may be unstable, as well.

Predefined - the user specifies which code channels are active manually.

Combination - the code channel selected by Predefined Active Channel is always regarded as Active and Auto Active Channel detection is performed. If Auto finds other active channels, they are also regarded as Active.

Key Path	Meas setup, more 1 of 3
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ACODe AUTO|COMBination|PREDefined` `[:SENSe]:RHO:MS:ACODe?`
Example	:RHO:MS:ACOD COMB
Preset	AUTO
State Saved	Saved in instrument state.
Range	Auto | Combination | Predefined
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ACODe`
Initial S/W Revision	Prior to A.02.00

Predefined Active Channel

Predefined Active Chan: Each channel (Pilot, DRC, RRI, ACK/DSC, Aux-Pilot or Data) can be set Active (On) or Inactive (Off). If Active Code Channel is set to Auto, each selection menu is greyed out. The specified

active channels are different due to subtype 0/1 or subtype 2.

Subtype 0/1:

- Pilot/RRI channel – Sets the pilot channel and RRI channel activation on W16(0) I phase.
- DRC channel – Sets the DRC channel activation on W16(8) Q phase.
- ACK channel – Sets the ACK channel activation on W8(4) I phase.
- Data channel – Sets the Data channel activation on W4(2) Q phase.

Subtype 2, and subtype3(NoFeedback Mux mode):

- Pilot channel – Sets the pilot channel activation on W16(0) I phase.
- DRC channel – Sets the DRC channel activation on W16(8) Q phase.
- RRI channel – Sets the RRI channel activation on W16(4) I phase.
- ACK/DSC channel – Sets the ACK channel and DSC channel activation on W32(12) I phase.
- Auxiliary Pilot channel – Sets the Auxiliary Pilot channel activation on W32(28) I phase.
- Data channel – Sets the Data channel activation. The location of Data channel is decided by modulation format. B4 is W4(2) Q phase. Q4 is W4(2). Q2 is W2(1). Q4Q2 is W4(2) and W2(1) with QPSK modulation. E4E2 is W4(2) and W2(1) with 8PSK modulation.

Key Path	Meas Setup, Active Code Chan
Initial S/W Revision	Prior to A.02.00

Pilot/RRI Channel [Common for Subtype 0/1 , Subtype 2 and Subtype3(NFM)]

Key Path	Meas Setup, more 1 of 3, Active Code Chan, Predefined Active Chan
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ACODe:PILot OFF|ON|0|1` `[:SENSe]:RHO:MS:ACODe:PILot?`
Example	:RHO:MS:ACOD:PIL ON
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined. In Subtype 2 and 3, Pilot channel and RRI channel are NOT time-multiplexed and these channels are assigned on different walsh code space. Therefore this key's label is different between Subtype 2/3 and Subtype 0/1. But SCPI command is same because this command was already used in Subtype 0/1.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ACODe:PILot`
Initial S/W Revision	Prior to A.02.00

DRC Channel Definition [Common for Subtype 0/1 , Subtype 2 and Subtype3(NFM)]

Key Path	Meas Setup, more 1 of 3, Active Code Chan, Predefined Active Chan
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ACODe:DRC OFF|ON|0|1` `[:SENSe]:RHO:MS:ACODe:DRC?`
Example	:RHO:MS:ACOD:DRC ON
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ACODe:DRC`
Initial S/W Revision	Prior to A.02.00

ACK Channel Definition [Subtype 0/1 only]

Key Path	Meas Setup, more 1 of 3, Active Code Chan, Predefined Active Chan
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ACODe:ACK OFF|ON|0|1` `[:SENSe]:RHO:MS:ACODe:ACK?`
Example	:RHO:MS:ACOD:ACK ON
Notes	This setting is valid with Active Code Chan is set to Combination or Predefined.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ACODe:ACK`
Initial S/W Revision	Prior to A.02.00

Data Channel Definition [Subtype 0/1 only]

Key Path	Meas Setup, more 1 of 3, Active Code Chan, Predefined Active Chan
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ACODe:DATA OFF|ON|0|1` `[:SENSe]:RHO:MS:ACODe:DATA?`
Example	:RHO:MS:ACOD:DATA ON

Notes	This setting is valid with Active Code Chan is set to Combination or Predefined.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ACODe:DATA`
Initial S/W Revision	Prior to A.02.00

Sync Start Slot

Before the first slot to start the measurement is depend on trigger timing or capture timing if trigger is set to Free Run.

This is a BAF key. Boolean parameter determines whether to enable synchronization start slot number specification. Sync Start Slot value is an absolute slot number in frame. When this mode is ON, first slot of result interval, which is equal to Capture Interval setting, becomes a slot of specified number.

If users use some kind of trigger, the first slot number is determined by trigger timing. The user can specify the synchronization start slot number by setting Sync Start Slot on. For example Sync start slot number is set to 5, the analysis starts from slot number 5.0. If Sync Start Slot detection mode is set to Off, keep backward compatibility and the measurement is done from trigger timing or capture timing.

Key Path	Meas Setup, More 1 of 3
Mode	1xEVDO

Remote Command	`[:SENSe]:RHO:MS:SSLot:NUMBer <integer>`
	`[:SENSe]:RHO:MS:SSLot:NUMBer?`
	`[:SENSe]:RHO:MS:SSLot[:STATe] OFF|ON|0|1`
	`[:SENSe]:RHO:MS:SSLot[:STATe]?`

Example	:RHO:MS:SSL:NUMB 5 :RHO:MS:SSL ON
Notes	Turn first slot number detection mode on or off.
Preset	0 OFF
State Saved	Saved in instrument state.
Range	0 to 15
Min	0
Max	15
Backwards Compatibility SCPI	`[:SENSe]:TRHO:SSLot:NUMBer`
Initial S/W Revision	Prior to A.02.00

Capture Interval

Modulation Accuracy measure with 1slot. So this softkey gives the information of capture length only and don't accept more than 1 slot setting.

Key Path	Meas Setup
Mode	1xEVDO
Notes	NO SCPI
Initial S/W Revision	Prior to A.02.00

Spectrum

Set a spectrum either to Normal or Inverted for the demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

Invert: This 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 low side mix.

Key Path	Meas Setup, More 1 of 3, More 2 of 3
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:SPECtrum NORMal|INVert` `[:SENSe]:RHO:MS:SPECtrum?`
Example	:RHO:MS:SPEC INV
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal | Invert
Backwards Compatibility SCPI	`[:SENSe]:TRHO:SPECtrum`
Initial S/W Revision	Prior to A.02.00

Advanced

Accesses a menu of functions that enable you to set up more specific parameters for the measurement.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

EVM Result I/Q Offset

Allows you to toggle the I/Q origin offset function between Std (standard) and Exclude.

• Std : The measurement results for EVM, Rho, and Modulation Accuracy (Rho) error takes into account the I/Q origin offset.

• Exclude : The measurement results for EVM, Rho, and Modulation Accuracy (Rho) error do not take into account the I/Q origin offset, and the message “EVM excludes I/Q Offset” is displayed in the lower right-hand graph display area.

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:IQOFfset:INCLude OFF|ON|0|1` `:CALCulate:RHO:MS:IQOFfset:INCLude?`
Example	:CALC:RHO:MS:IQOF:INCL OFF
Preset	ON
State Saved	Saved in instrument state.
Range	Std | Exclude
Backwards Compatibility SCPI	`:CALCulate:TRHO:IQOFfset:INCLude`
Initial S/W Revision	Prior to A.02.00

Active Set Threshold

Sets the threshold value for the active channel detection. And user can select the active channel identification function between Auto and Man. If set to Auto, the active channels are determined automatically by the internal algorithm. If it set to Man, the active channel identification is determined by a user definable threshold ranging from 0.00 to –100.0 dB.

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced
Mode	1xEVDO

Remote Command	`:CALCulate:RHO:MS:ASET:THReshold <real>`
	`:CALCulate:RHO:MS:ASET:THReshold?`
	`:CALCulate:RHO:MS:ASET:THReshold:AUTO OFF|ON|0|1`
	`:CALCulate:RHO:MS:ASET:THReshold:AUTO?`

Example	:CALC:RHO:MS:ASET:THR –20 :CALC:RHO:MS:ASET:THR:AUTO OFF
Notes	Turn the automatic mode On or Off, for the active channel identification function. OFF – The active channel identification for each code channel is determined by a value set by CALCulate:RHO:MS:ASET:THReshold. ON – The internal algorithm determines the active channels automatically.
Preset	0.0 ON
State Saved	Saved in instrument state.

Range	–100 to 0.0
Min	–100
Max	0
Backwards Compatibility SCPI	`:CALCulate:TRHO:ASET:THReshold`
Initial S/W Revision	Prior to A.02.00

Chip Rate

Changes the Chip Rate

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:CRATe <freq>` `[:SENSe]:RHO:MS:CRATe?`
Example	:RHO:MS:CRAT 1.22 MHz
Preset	1.2288 MHz
State Saved	Saved in instrument state.
Range	1.10592 MHz to 1.35168 MHz
Min	1.10592 MHz
Max	1.35168 MHz
Backwards Compatibility SCPI	`[:SENSe]:TRHO:CRATe`
Initial S/W Revision	Prior to A.02.00

Filter Alpha

Selects one of 4 complementary filters. These complementary filters are designed to have raised cosine frequency responses of slightly different roll off factors, Alpha, conjunction with a TX filter defined in the standard. The smaller the Filter Alpha is, the better the adjacent power rejection performance becomes. Default of this parameter is 0.15.

Key Path	Meas Setup, More 1of 3, More 2 of 3, Advanced
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:ALPHa <real>` `[:SENSe]:RHO:MS:ALPHa?`
Example	:RHO:MS:ALPH 0.05
Preset	0.15
State Saved	Saved in instrument state.

Range	0.05 to 0.20
Min	0.05
Max	0.20
Backwards Compatibility SCPI	`[:SENSe]:TRHO:ALPHa`
Initial S/W Revision	Prior to A.02.00

Multi Channel Estimator

Allows you to toggle the multi channel estimator function between On and Off.

- On: The individual code channels are aligned to the pilot channel to improve the phase error (whether each code phase is aligned or not). This takes longer to accomplish.
- Off: The phase information is computed from one coded signal only. (The phase of each code channel needs to be aligned to the pilot channel.)

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced, More 1 of 2
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:MCEStimator OFF|ON|0|1` `[:SENSe]:RHO:MS:MCEStimator?`
Example	:RHO:MS:MCES ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Backwards Compatibility SCPI	`[:SENSe]:TRHO:MCEStimator`
Initial S/W Revision	Prior to A.02.00

Timing Estimation

Selects timing estimation function between channel-by-channel and global.

- Channel-by-Channel: The individual code channels are estimated as each timing. This takes a longer time.
- Global: The individual code channels are estimated as global timing.

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced, More 1 of 2
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:MCEStimator:TIMing CHANnel|GLOBal` `[:SENSe]:RHO:MS:MCEStimator:TIMing?`

Example	:RHO:MS:MCES:TIM CHAN
Preset	GLOBal
State Saved	Saved in instrument state.
Range	CHANnel | GLOBal
Backwards Compatibility SCPI	`[:SENSe]:TRHO:MCEStimator:TIMing`
Initial S/W Revision	Prior to A.02.00

Freq Error Tolerance Range

Frequency error tolerance range is specified:

- Narrow
- Normal
- Wide

'Wide' provides the wide range of the frequency error tolerance. But the more complex signal to demodulate correctly, the less frequency tolerance range is required. For example, composite number of channels is modulated on the test signal, the modulation is complex, and frequency error is very critical to demodulate correctly. Therefore, In such a case, to demodulate complex signal, it needs to set 'Narrow'. "Wide" parameter makes improvement for the frequency error tolerance range and "Narrow" parameter does the sensitivity for synchronization. Therefore the measurement speed is trade off these functionalities. "Normal" parameter focuses the measurement speed. The default is "Normal". User selects the suitable parameter depending on the using signal condition.

Key Path	Meas Setup, More 1 of 3, More 2 of 3, Advanced, More 1 of 2
Mode	1xEVDO
Remote Command	`[:SENSe]:RHO:MS:FERRor:TRANge NARRow|NORMal|WIDE` `[:SENSe]:RHO:MS:FERRor:TRANge?`
Example	:RHO:MS:FERR:TRAN NARR
Preset	NORMal
State Saved	Saved in instrument state.
Range	Narrow | Normal | Wide
Backwards Compatibility SCPI	`[:SENSe]:TRHO:FERRor:TRANge`
Initial S/W Revision	Prior to A.02.00

Meas Preset

This key allows users to restore all the measurement settings to their defaults.

This will set the measure setup parameters for the currently selected measurement only, to the factory defaults.

Key Path	Meas Setup
Mode	1xEVDO
Remote Command	`:CONFigure:RHO:MS`
Example	:CONFigure:RHO:MS
Couplings	Selecting measurement preset will restore all measurement parameters to their default values for the current measurement.
Backwards Compatibility SCPI	`:CONFigure:TRHO`
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 200

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 1917 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 219

Peak Search

Accesses a menu that enables you to control the peak search function and places a marker on the trace point with highest peak.

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	Front panel key
Mode	1XEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum`
Example	CALC:RHO:MS:MARK2:MAX
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:MAXimum`
Initial S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the marker's current value.

Key Path	Peak Search
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:NEXT`
Example	CALC:RHO:MS:MARK2:MAX:NEXT
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:MAXimum:NEXT`
Initial S/W Revision	Prior to A.02.00

Next Pk Right

Moves the selected marker to the nearest peak right of the current marker which meets all enabled peak criteria.

Key Path	Peak Search
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:RIGHt`
Example	CALC:RHO:MS:MARK2:MAX:RIGH
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:MAXimum:RIGHt`
Initial S/W Revision	Prior to A.02.00

Next Pk Left

Moves the selected marker to the nearest peak left of the current marker which meets all enabled peak criteria.

Key Path	Peak Search
Mode	1XEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MAXimum:LEFT`
Example	CALC:RHO:MS:MARK2:MAX:LEFT
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:MAXimum: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. Basically this sets the control mode for the selected marker to Delta mode. See the Marker chapter for the complete description of this function. The key is duplicated here in the Peak Search Menu to allow the user 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
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:PTPeak`
Example	CALC:RHO:MS:MARK:PTP
Notes	Turns on the Marker Δ
Couplings	This key is not available (key is grayed out) when Coupled Markers is on.
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:PTPeak`
Initial S/W Revision	Prior to A.02.00

Min Search

Moves the selected marker to the minimum y-axis value on the current trace.

Key Path	Peak Search
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:MARKer[1]|2|...12:MINimum`
Example	CALC:RHO:MS:MARK:MIN
Backwards Compatibility SCPI	`:CALCulate:TRHO:MARKer[1]|2|...4:MINimum`
Initial S/W Revision	Prior to A.02.00

Print

See "Print " on page 229

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.

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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 andTraces. 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).

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	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>. 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.
Backwards Compatibility Notes	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. 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.
Backwards Compatibility Notes	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. 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. 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. 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.
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	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. • If there is a mismatch between file version or model number or instrument version or model number, the recall functiontries 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. After recalling the state, the Recall State function does the following: • 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 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 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

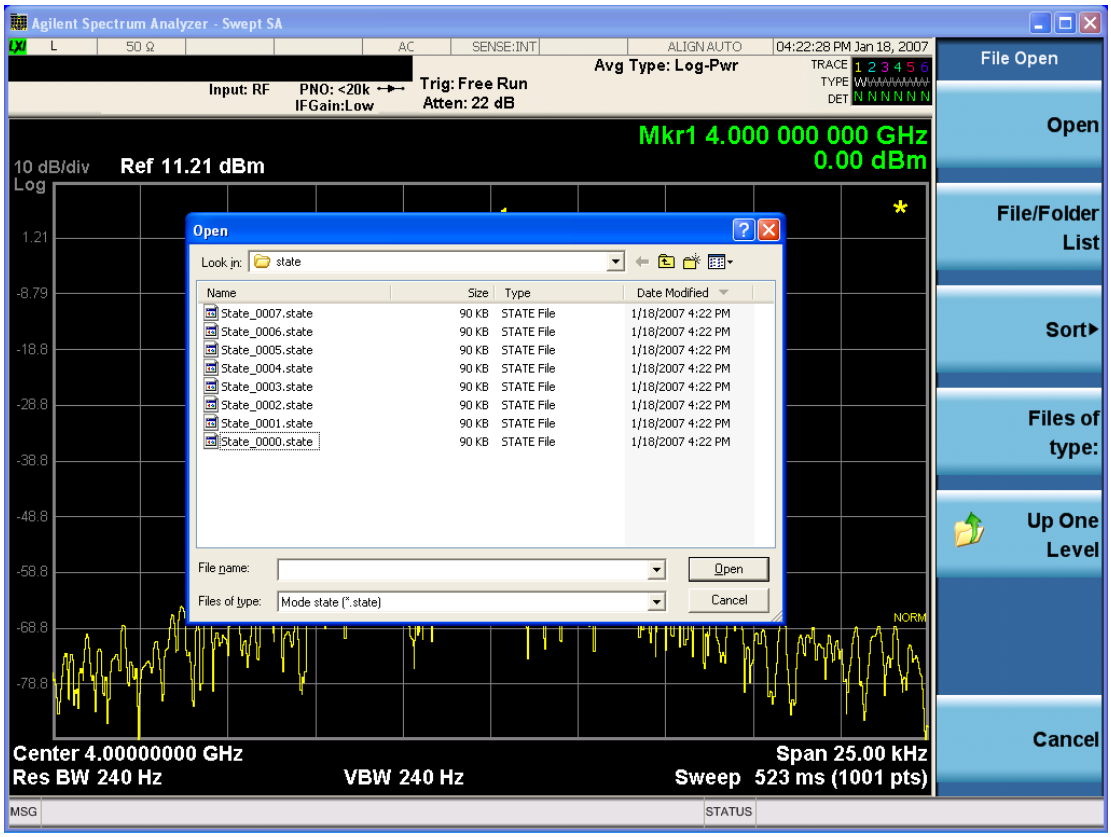
In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If 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 willhave 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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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

Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to 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 including .trace 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	Recall
Mode	SA
Remote Command	`:MMEMory:LOAD:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5`

	| TRACE6,<integer>
Example	MMEM:LOAD:TRAC TRACE2, "MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, andis set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Notes	When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace 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 and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled. Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating(so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data(to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved. After the Recall the analyzer exits the Recall menu and returns to the previous menu. Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> Some modes and measurements have more than 6 traces available. The Realtime SA mode command, for example, is: MMEMory:STORe:TRACe TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | TRACE7 | TRACE8 | TRACE9 | TRACE10 | TRACE11 | TRACE12 | ALL,<filename>
Initial S/W Revision	Prior to A.02.00

To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "To Trace" is ignored and the traces each go back to the trace from which they were saved.

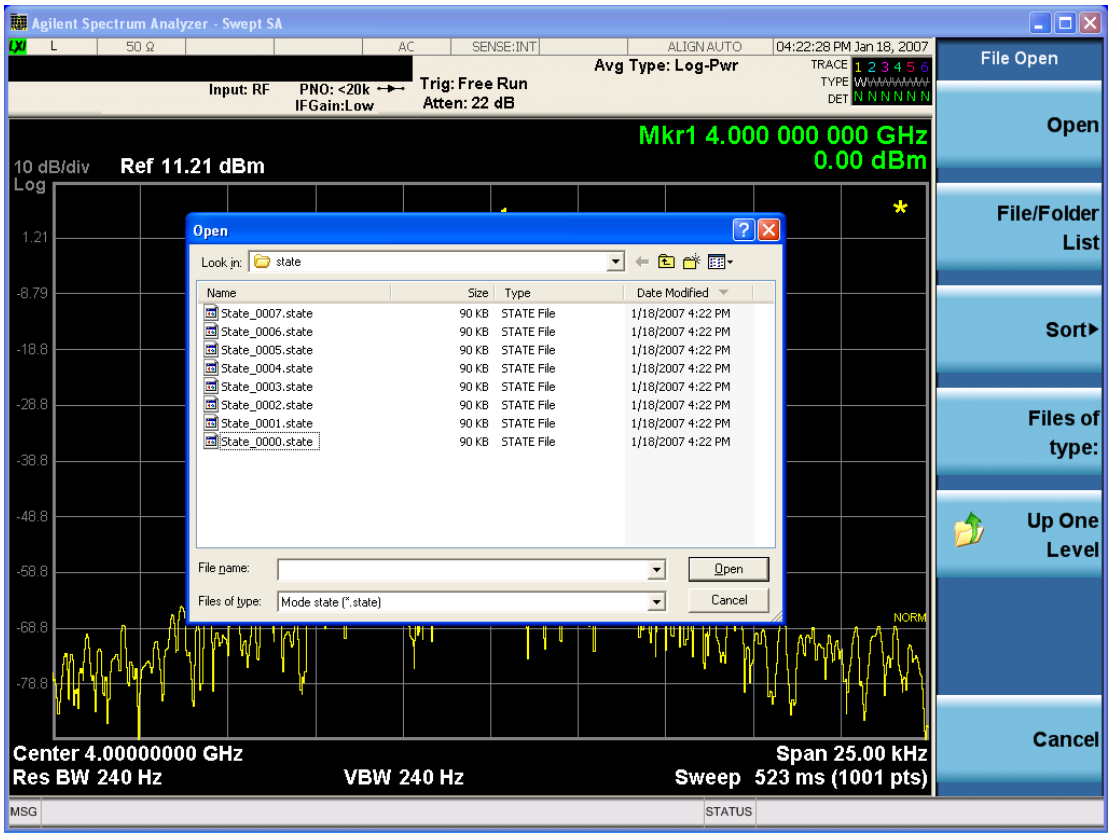
Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled.To trigger a recall of the selected Trace, you must select the Open key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path	Save, Data, Trace
Mode	SA
Initial S/W Revision	Prior to A.02.00

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

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.

NOTE In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

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: | SLISt | ALISt | SAAList | "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 1934in 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

Capture Buffer

The captured data is raw data which is not processed.

Key Path	Recall, Data
Mode	**CDMA1XEV**
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1934in 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 1939

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.

NOTE In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save 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

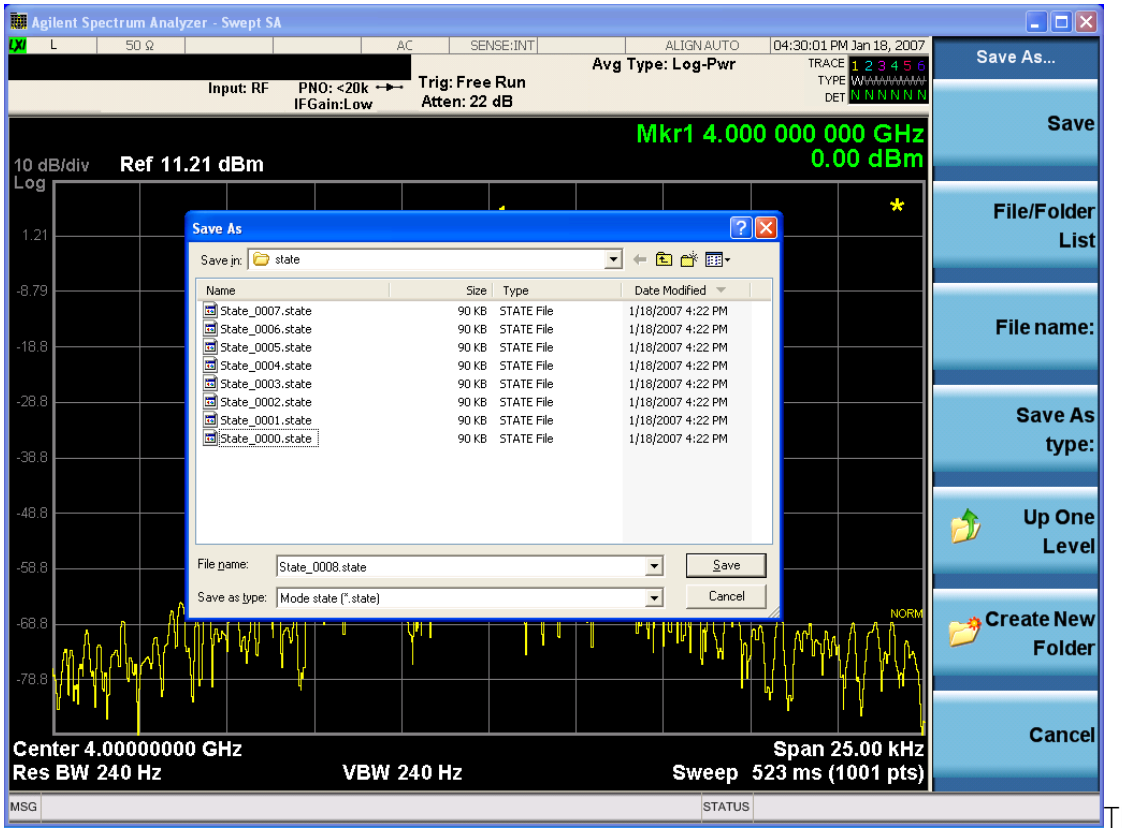
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

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>` For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.
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 1924 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 1944

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.

NOTE **In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.**

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.

NOTE In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

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	The string must be a valid logical path. 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. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
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	The string must be a valid logical path. Copies 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.

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	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. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

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

Mass Storage Determine Removable Media (Remote Command Only)

This command is used to determine if any removable media devices are connected to the instrument. Primarily, these are USB memory devices plugged-in to the front panel or rear panel USB ports. On instruments with PC6 or PC7 CPU's, one SD card slot is available for removable media. The instrument's primary disk drive is not a removable media device.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LIST?`
Notes	The return value will be a string containing a list of partition identifiers which are removable media devices. Each identifier will be separated by a comma. If no removable media is present, an empty string will be returned. Examples: One removable device present will result in a return string of "F:". Two removable devices present will result in a return string of "F:,G:". No removable devices present will result in a return string of "".
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Label (Remote Command Only)

This command is used to set or query a removable media device's label.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:LABel <partition>,<string>` `:MMEMory:RMEDia:LABel? <partition>`
Example	MMEM:RMED:LAB "F:","My Device"
Notes	If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated. Setting the removable media label requires Administrative privileges. If the currently logged in use does not have appropriate privileges the error "–221.9900,Settings conflict;Administrator privileges required" is generated.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media Write-protect status (Remote Command Only)

This command is used to query a removable media device's write-protect status.

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:WPRotect? <partition>`
Example	MMEM:RMED:WPR? "F:"
Notes	The return value is 1 if the device is write-protected, and 0 if the device is write-enabled. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Preset	The return value will be depending on SD card installed.
Initial S/W Revision	x.15.00

Mass Storage Determine Removable Media size (Remote Command Only)

This command is used to query a removable media device's total memory size (not available memory size).

Key Path	SCPI Only
Remote Command	`:MMEMory:RMEDia:SIZE? <partition>`
Example	MMEM:RMED:SIZE? "F:"
Notes	The return value is integer value in GBytes. Any device which is less than 1 GB will return 0 GB. If the <partition> specified does not exist or is not a removable media device the error –252,"Missing Media" will be generated.
Initial S/W Revision	x.15.00

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 youto 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:STORe 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

Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which Meas Result to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See "Meas Results File Contents" on page 1953.

See "Marker Table" on page 1953.

See "Peak Table" on page 1956.

See "Spectrogram" on page 1959

Remote Command	`:MMEMory:STORe:RESults:MTABle|PTABle|SPECtrogram <filename>`

Example	:MMEM:STOR:RES:MTAB “myResults.csv” Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB “myResults.csv” Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC “myResults.csv” Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, 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. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

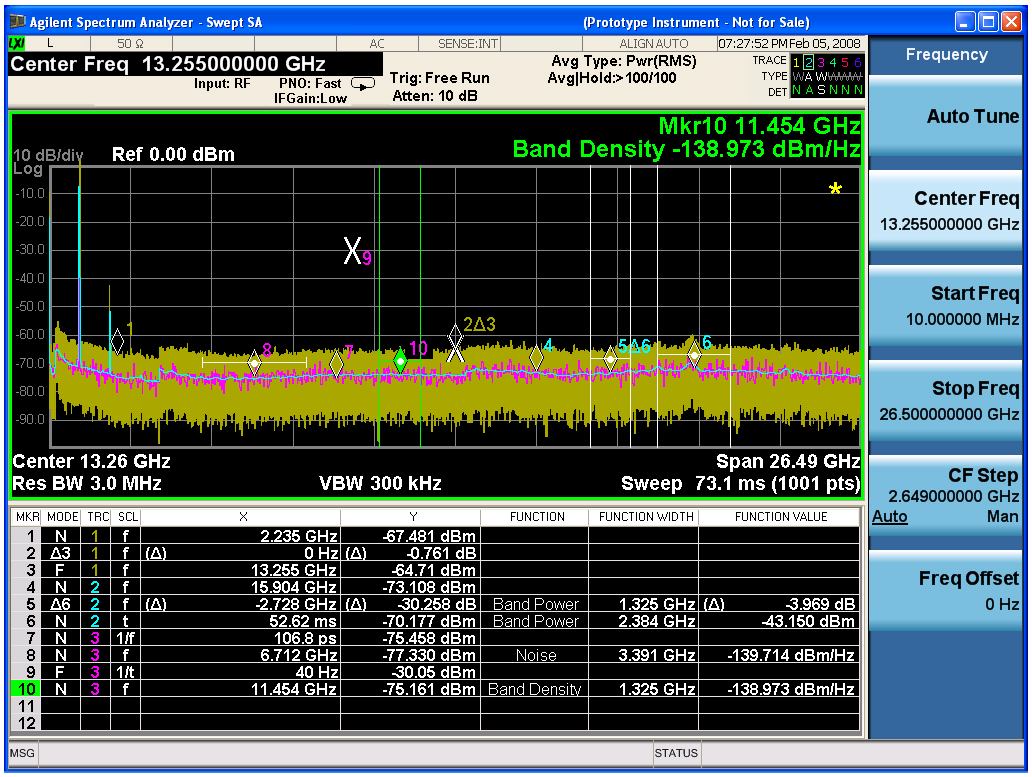
Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower (Video)
RBW	3000000

RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E–06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
DATA	

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	FUNCTION UNIT
1	Normal	1	Frequency	2.2350E+09	–67.481	Off	0.0000E+00	0	None
2	Delta3	1	Frequency	0.0000E+00	–0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	–64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	–73.1	Off	0.0000E+00	0	None

					08				
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

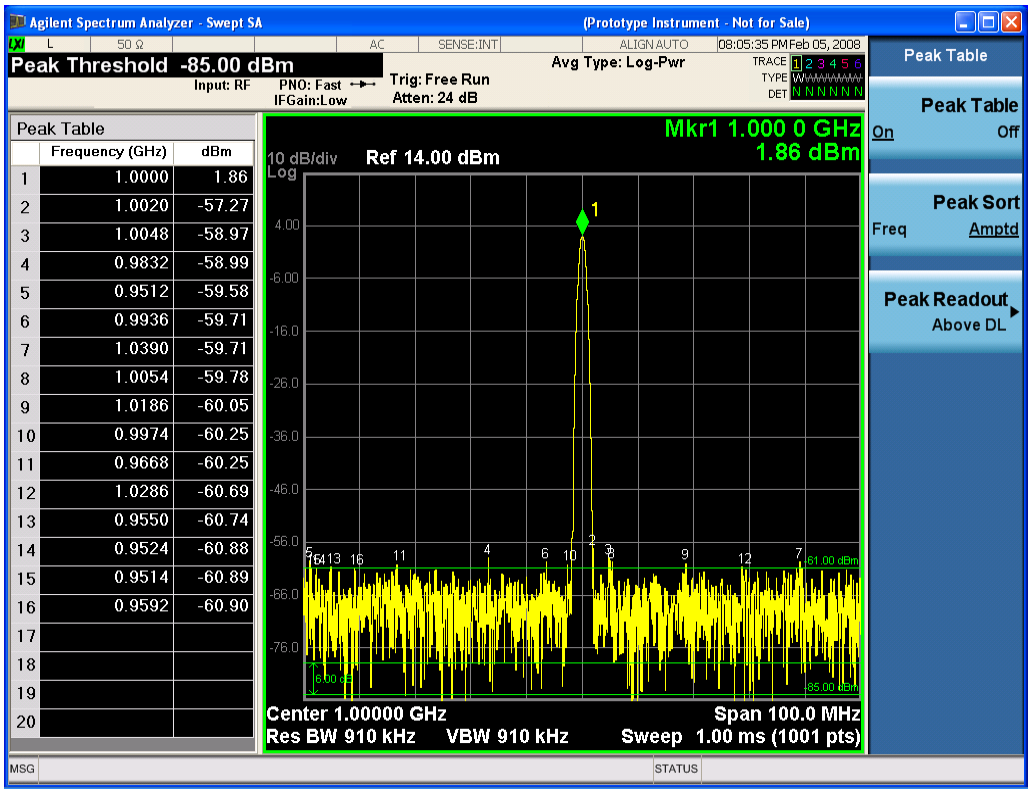
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	–61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	–57.27
3	1.0048E+06	–58.97
4	9.8320E+05	–58.99
5	9.5120E+05	–59.58
6	9.9360E+05	–59.71
7	1.0390E+06	–59.71
8	1.0054E+06	–59.78
9	1.1086E+06	–60.05
10	9.9740E+05	–60.25
11	9.6680E+05	–60.25
12	1.0286E+06	–60.69
13	9.5500E+05	–60.74
14	9.5240E+05	–60.88
15	9.5140E+05	–60.89
16	9.5920E+05	–60.90
17		
18		
19		
20		

Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

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Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

NOTE The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:

For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a duifferent time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 secodns after the Spectrogram started (trace 10 has a strat time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
F03 F07 F13 F26 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	–76.34749519
5999984440	–77.28097006
5999984465	–75.32317869
5999984490	–73.64417681
5999984515	–72.67154604

o

o

o

6000009315	–77.94423277
6000009340	–79.51829697
6000009365	–78.46108961
6000009390	–78.46108957
6000009415	–76.59570596
DATA2	4.708697055

5999984415	–80.98197882
5999984440	–80.98197879
5999984465	–75.83142132
5999984490	–74.02712079
5999984515	–73.57213005

o

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o

6000009315	–75.9183103
6000009340	–79.53787488
6000009365	–78.82602191
6000009390	–78.82602188
6000009415	–76.37486709
DATA10	0
5999984415	–75.56751112
5999984440	–75.76485645
5999984465	–76.67718717
5999984490	–78.79238489
5999984515	–83.72680212

o

o

o

6000009315	–71.3942461
6000009340	–72.28308332
6000009365	–73.92684489
6000009390	–75.45548832
6000009415	–75.17904815

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data which is not processed.

Key Path	Save, Data
Mode	CDMA1XEV
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Dependencies	In case the capture buffer data is not available from the selected measurement, the key will be grayed out.
Initial S/W Revision	A.11.00

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 1942 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

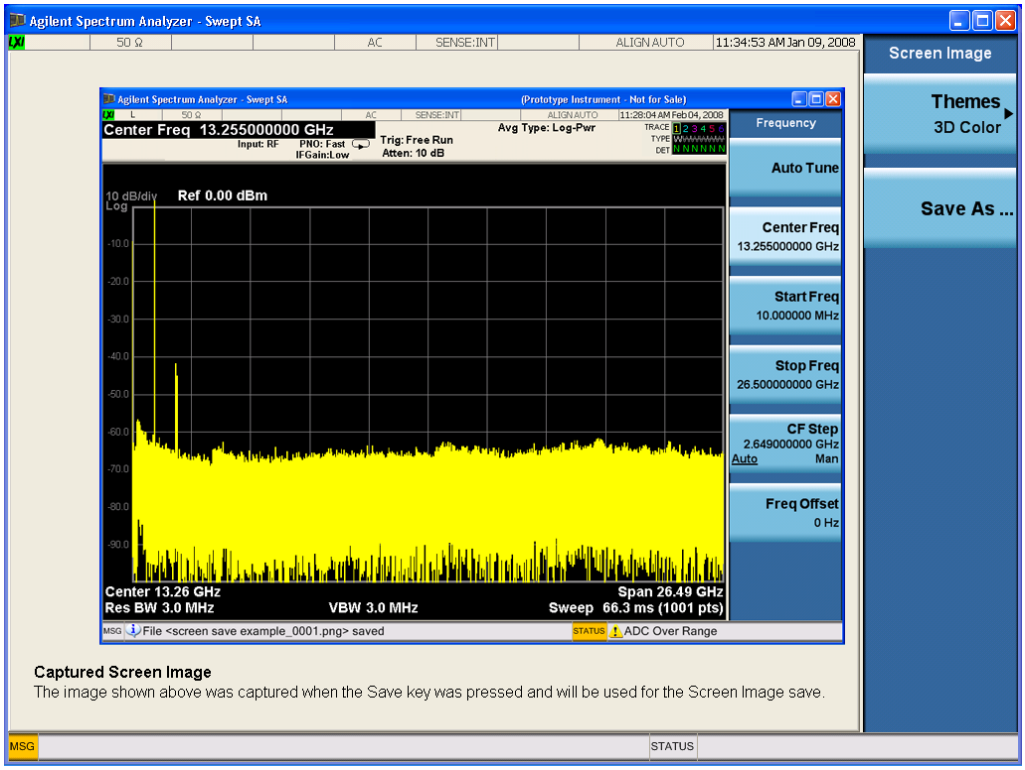
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

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: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 1942 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 1968

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	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. 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. 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.
Initial S/W Revision	Prior to A.02.00

More Information

See "Restart" on page 1939 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	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. This setting is for the independent mode and has no effect on the "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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. 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 2040 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.
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	The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 2040. If the "Sequencer" on page 2040 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 2040 to Off will make source leave list sequencer and this button will be black out.
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 1971 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	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. 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. 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. 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.
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 the "RF Power Range " on page 1971 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 1971 table below for the valid ranges.
Initial S/W Revision	A.05.00

All other models:

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.

M9420A:

RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power without Option "1EA"	Max Output Power with Option "1EA"
RF Output	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	18 dBm
RFHD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	10 dBm	15 dBm
RFFD	60 MHz ≤ f ≤ 6 GHz	–150 dBm	0 dBm	0 dBm

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 2040 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 1971

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 2040 is turned ON.
Couplings	This value is coupled to the "Set Reference Power " on page 1971 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 2040. If the "Sequencer" on page 2040 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 setto 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 2040 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 2040. If the "Sequencer" on page 2040 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 If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present,the frequency range should be limited to: 1.1GHz–1.7GHz,

	2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called “Settings conflict; Frequency is outside available range”.
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 1975, "W-CDMA Channel Number Ranges" on page 1976, "CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1978, and "LTE FDD Channel Number Ranges" on page 1980.

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 1983 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1983 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 1983 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)	$1 \le n \le 124$	890.0 + 0.2*n
	Downlink (BS)	$1 \le n \le 124$	935.0 + 0.2*n
E-GSM	Uplink (MS)	$0 \le n \le 124$	890.0 + 0.2*n
		$975 \le n \le 1023$	890.0 + 0.2*(n–1024)
	Downlink (BS)	$0 \le n \le 124$	935.0 + 0.2*n
		$975 \le n \le 1023$	935.0 + 0.2*(n–1024)

Band	Link (Device)	Range	Frequency (MHz)
DCS 1800	Uplink (MS)	512 ≤ n ≤ 885	1710.200 + 0.20*(n–512)
	Downlink (BS)	512 ≤ n ≤ 885	1805.200 + 0.20*(n–512)
PCS 1900	Uplink (MS)	512 ≤ n ≤ 810	1850.200 + 0.2*(n–512)
	Downlink (BS)	512 ≤ n ≤ 810	1930.200 + 0.2*(n–512)
R-GSM	Uplink (MS)	0 ≤ n ≤ 124	890.0 + 0.2*n
		955 ≤ n ≤ 1023	890.0 + 0.2*(n–1024)
	Downlink (BS)	0 ≤ n ≤ 124	935.0 + 0.2*n
		955 ≤ n ≤ 1023	935.0 + 0.2*(n–1024)
GSM 450	Uplink (MS)	256 ≤ n ≤ 293	450.6 + 0.2*(n–259)
	Downlink (BS)	256 ≤ n ≤ 293	460.6 + 0.2*(n–259)
GSM 480	Uplink (MS)	306 ≤ n ≤ 340	479.000 + 0.20*(n–306)
	Downlink (BS)	306 ≤ n ≤ 340	489.000 + 0.20*(n–306)
GSM 850	Uplink (MS)	128 ≤ n ≤ 251	824.200 + 0.20*(n–128)
	Downlink (BS)	128 ≤ n ≤ 251	869.200 + 0.20*(n–128)
GSM 700	Uplink (MS)	438 ≤ n ≤ 516	777.200 + 0.20*(n–438)
	Downlink (BS)	438 ≤ n ≤ 516	747.200 + 0.20*(n–438)
T-GSM810	Uplink (MS)	350 ≤ n ≤ 425	806.0 + 0.20*(n–350)
	Downlink (BS)	350 ≤ n ≤ 425	851.0 + 0.20*(n–350)

W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	10562 ≤ n ≤ 10838	n÷5
	Uplink	9612 ≤ n ≤ 9888	n÷5
Band II	Downlink	412 ≤ n ≤ 687	n÷5 + 1850.1
		9662 ≤ n ≤ 9938	n÷5
	Uplink	12 ≤ n ≤ 287	n÷5 + 1850.1
		350 ≤ n ≤ 425	n÷5
Band III	Downlink	1162 ≤ n ≤ 1513	n÷5 + 1575
	Uplink	937 ≤ n ≤ 1288	n÷5 + 1525
Band IV	Downlink	537 ≤ n ≤ 1738	n÷5 + 1805
		1887 ≤ n ≤ 2087	n÷5 + 1735.1
	Uplink	1312 ≤ n ≤ 1513	n÷5 + 1450
		1662 ≤ n ≤ 1862	n÷5 + 1380.1
Band V	Downlink	1007 ≤ n ≤ 1087	n÷5 + 670.1
		4357 ≤ n ≤ 4458	n÷5

Band	Link (Device)	Range	Frequency (MHz)
	Uplink	782 ≤ n ≤ 862	n÷5 + 670.1
		4132 ≤ n ≤ 4233	n÷5
Band VI	Downlink	1037 ≤ n ≤ 1062	n÷5 + 670.1
		4387 ≤ n ≤ 4413	n÷5
	Uplink	812 ≤ n ≤ 837	n÷5 + 670.1
		4162 ≤ n ≤ 4188	n÷5
Band VII	Downlink	2237 ≤ n ≤ 2563	n÷5 + 2175
		2587 ≤ n ≤ 2912	n÷5 + 2105.1
	Uplink	2012 ≤ n ≤ 2338	n÷5 + 2100
		2362 ≤ n ≤ 2687	n÷5 + 2030.1
Band VIII	Downlink	2937 ≤ n ≤ 3088	n÷5 + 340
	Uplink	2712 ≤ n ≤ 2863	n÷5 + 340
Band IX	Downlink	9237 ≤ n ≤ 9387	n÷5
	Uplink	8762 ≤ n ≤ 8912	n÷5
Band X	Downlink	3112 ≤ n ≤ 3388	n÷5 + 1490
		3412 ≤ n ≤ 3687	n÷5 + 1430.1
	Uplink	2887 ≤ n ≤ 3163	n÷5 + 1135
		3187 ≤ n ≤ 3462	n÷5 + 1075.1
Band XI	Downlink	3712 ≤ n ≤ 3812	n÷5 + 736
	Uplink	3487 ≤ n ≤ 3587	n÷5 + 733
Band XII	Downlink	3837 ≤ n ≤ 3903	n÷5 – 37
		3927 ≤ n ≤ 3992	n÷5 – 54.9
	Uplink	3612 ≤ n ≤ 3678	n÷5 – 22
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIII	Downlink	4017 ≤ n ≤ 4043	n÷5 – 55
		4067 ≤ n ≤ 4092	n÷5 – 64.9
	Uplink	3792 ≤ n ≤ 3818	n÷5 + 21
		3702 ≤ n ≤ 3767	n÷5 – 39.9
Band XIV	Downlink	4117 ≤ n ≤ 4143	n÷5 – 63
		4167 ≤ n ≤ 4192	n÷5 – 72.9
	Uplink	3892 ≤ n ≤ 3918	n÷5 + 12
		3942 ≤ n ≤ 3967	n÷5 + 2.1
Band XIX	Downlink	712 ≤ n ≤ 763	n÷5 + 735
		787 ≤ n ≤ 837	n÷5 + 720.1
	Uplink	312 ≤ n ≤ 363	n÷5 + 770
		387 ≤ n ≤ 437	n÷5 + 755.1

CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.030×N+ 825.000
		991 ≤ N ≤ 1023	0.030× (N–1023) + 825.000
		1024 ≤ N ≤ 1323	0.030× (N–1024) + 815.040
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.030*N+ 870.000
		991 ≤ N ≤ 1023	0.030×(N–1023) + 870.000
		1024 ≤ N ≤ 1323	0.030×(N–1024) + 860.040
US PCS	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	1930.000 + 0.050×N
Japan Cellular Band	Uplink (MS, reverse link)	1 ≤ N ≤ 799	0.0125×(N+ 915.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 898.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 887.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 893.000
	Downlink (BS, forward link)	1 ≤ N ≤ 799	0.0125×(N+ 860.000
		801 ≤ N ≤ 1039	0.0125×(N–800)+ 843.000
		1041 ≤ N ≤ 1199	0.0125×(N–1040)+ 832.000
		1201 ≤ N ≤ 1600	0.0125×(N–1200)+ 838.000
Korean PCS Band	Uplink (MS, reverse link)	0 ≤ N ≤ 599	0.050×N+ 1750.000
	Downlink (BS, forward link)	0 ≤ N ≤ 599	0.050×N+ 1840.000
NMT–450 Band	Uplink (MS, reverse link)	1 ≤ N ≤ 400	0.025×(N–1)+ 450.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 410.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 451.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 479.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 479.000
	Downlink (BS, forward link)	1 ≤ N ≤ 400	0.025×(N–1)+ 460.000
		472 ≤ N ≤ 871	0.025×(N–472)+ 420.000
		1039 ≤ N ≤ 1473	0.020×(N–1024)+ 461.010
		1536 ≤ N ≤ 1715	0.025×(N–1536)+ 489.000
		1792 ≤ N ≤ 2016	0.020×(N–1792)+ 489.000
IMT–2000 Band	Uplink (MS, reverse link)	0 ≤ N ≤ 1199	1920.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1199	2100.000 + 0.050×N
Upper 700 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 240	776.000 + 0.050×N
	Downlink (BS,	0 ≤ N ≤ 240	746.000 + 0.050×N

Band	Link (Device)	Range	Frequency (MHz)
	forward link)		
Secondary 800 MHz Band	Uplink (MS, reverse link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 806.000 0.025×(N–720) + 896.000
	Downlink (BS, forward link)	0 ≤ N ≤ 719 720 ≤ N ≤ 919	0.025×N+ 851.000 0.025×(N–720) + 935.000
2.5 GHz IMT Extension	Uplink (MS, reverse link)	0 ≤ N ≤ 1399	2500.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1399	2620.000 + 0.050×N
US PCS 1.9 GHz	Uplink (MS, reverse link)	0 ≤ N ≤ 1299	1850.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 1299	1930.000 + 0.050×N
AWS	Uplink (MS, reverse link)	0 ≤ N ≤ 899	1710.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 899	2100.000 + 0.050×N
US 2.5 GHz	Uplink (MS, reverse link)	140 ≤ N ≤ 1459	2495.000 + 0.050×N
	Downlink (BS, forward link)	140 ≤ N ≤ 1459	2617.000 + 0.050×N
700 Public Safety	Uplink (MS, reverse link)	0 ≤ N ≤ 240	787.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 240	757.000 + 0.050×N
C2K Lower 700	Uplink (MS, reverse link)	0 ≤ N ≤ 360	698.000 + 0.050×N
	Downlink (BS, forward link)	0 ≤ N ≤ 360	728.000 + 0.050×N
400 Euro PAMR	Uplink (MS, reverse link) Uplink (MS, reverse link) Uplink (MS, reverse link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 450.000 0.025×(N–472)+ 410.000 0.025×(N–1536)+ 479.000
	Downlink (BS, forward link) Downlink (BS, forward link) Downlink (BS, forward link)	1 ≤ N ≤ 400 472 ≤ N ≤ 871 1536 ≤ N ≤ 1715	0.025×(N–1)+ 460.000 0.025×(N–472)+ 420.000 0.025×(N–1536)+ 489.000

Band	Link (Device)	Range	Frequency (MHz)
800 PAMR	Uplink (MS, reverse link)	0 ≤ N ≤ 239	870.0125 + 0.025×N
	Downlink (BS, forward link)	0 ≤ N ≤ 239	915.0125 + 0.025×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	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949

Band	Downlink	Uplink				
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
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
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:

Nt = 5*F 0.0 MHz ≤ F≤ 3276.6 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:

Nt = 5 * (F – 2150.1 MHz)2572.5 MHz ≤ F≤ 2617.5 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 1975 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

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 1999

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 2015, "AM" on page 2036, "FM" on page 2037, and "PM" on page 2039.

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 2040Sequencer 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 2040Sequencer 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
Preset	Off
Range	On | Off
Initial S/W Revision	A.05.00

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.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

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	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. <string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB. 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 . 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. 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. 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. 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. 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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
Notes	This setting cannot be set in E6640A/M9420A. Grey out on menu and the value is fixed at 70.00%.
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/M9420A 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 2036 “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 2040 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 2036 “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 2009 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	If no waveform is selected, invoking this operation will get error "–221 Setting conflict; No waveform is selected for RMS operation". If no waveform is selected, or selected waveform is waveform sequence, the key will grey out. If selected waveform does not contain marker data, but "RMS Calculation Mode" on page 2009 "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 2009 "RMS Calculation Mode" will be coupled to "Auto" mode automatically. 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.
Initial S/W Revision	A.14.50

Use Header RMS

Allows you to quickly set RMS in ARB header to "Current RMS" on page 2009 Current RMS setting.

Key Path	Source, Modulation Setup, ARB, ARB Setup, Edit RMS,
Notes	No remote command, front panel only. If no waveform is selected, the key will grey out. If no waveform is selected, invoking this operation will get error "–221 Setting conflict; No waveform is selected for RMS operation".
Initial S/W Revision	A.14.50

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

ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
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

External Trigger Delay

This key allows you to toggle the state and value of external trigger delay. The value you enter sets a delay time between when an external trigger is received and when it is applied to the waveform. This is key is

active only if you select external trigger as trigger source.

Key Path	Source, Modulation Setup, ARB, Trigger Source

Remote Command	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?`
	`SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe OFF | ON | 0 | 1`
	`:SOURce:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?`

Example	:SOUR:RAD:ARB:TRIG:EXT:DEL 100ns :SOUR:RAD:ARB:TRIG:EXT:DEL? :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT ON :SOUR:RAD:ARB:TRIG:EXT:DEL:STAT?
Notes	External trigger delay time set by users will be rounded to the nearest integer multiple of the resolution.
Dependencies	This setting is unavailable and is grayed out when the Trigger Source is not set to external trigger.
Preset	1 ms OFF
Min	0 s
Max	8.589934588 s (Note: This value comes from 4ns * (2^31 – 1) = 8589934588 ns)
Initial S/W Revision	A.14.50

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, SCPIfront 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, SCPIfront 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, SCPIfront 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, SCPIfront 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.

	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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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, SCPIfront 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

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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the

connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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

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 attmpt to input a slot number less than or equals 0, an error is generated.
Initial S/W Revision	A.05.00

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 attmpt 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 attmpt 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

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 maker 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

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).

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) 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 µs
Amplitude	100 µs to within 0.1 dB 20 µs 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

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 1970 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 1970 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 outpu 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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	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. <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>. 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. When Include Source is Noand if there is insufficient free ARB memory to load the selected waveform, an error is generated. . If you specify a file over SCPI, but the file is not at the specified location, an error is generated. If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated. If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated. 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. 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.
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.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. 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. 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. 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. 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

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	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. 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. If you attempt to delete all files from ARB memory when there are waveform files used in "List Sequencer" on page 2040 and "Sequencer" on page 2040 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

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.

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 “Duraton 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

Repetition

Allows access to the sub-menu for selecting the repetition type for the list sequencer globally. It cannot be changed between different sequence steps.

Key Path	Source, List Sequencer
Remote Command	`:SOURce:LIST:REPetition:TYPE SINGle|CONTinuous`
Example	:SOUR:LIST:REP:TYPE SING :SOUR:LIST:REP:TYPE?
Preset	SINGle
Range	SINGle|CONTinuous
Initial S/W Revision	A.14.50

Single

Sets the repetition type as single for the whole source sequence. Source list will play one time after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE SINGle
Initial S/W Revision	A.14.50

Continuous

Sets the repetition type as continuous for the whole source sequence. Source list will play continuously after initiation.

Key Path	Source, List Sequencer, Repetition
Example	:SOUR:LIST:REP:TYPE CONTinuous
Initial S/W Revision	A.14.50

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
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
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
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
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
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
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
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

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 desired horizontal scale parameters.

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

X Ref Value

Controls the reference value of the X scale of the current measurement.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, Magnitude Error window)

Sets the reference value on the horizontal axis in the Magnitude Error window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, Phase Error window)

Sets the reference value on the horizontal axis in the Phase Error window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Ref Value (I/Q Error (Quad View) view, EVM window)

Sets the reference value on the horizontal axis in the EVM window of the I/Q Error (Quad View) view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:X:RLEV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000000
Max	5000000.0
Backwards	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:X[:SCALe]:RLEVel`

Compatibility SCPI	
Initial S/W Revision	Prior to A.02.00

X Ref Value (Code Domain Power view, Power Bar Graph window)

Sets the power reference value on the horizontal axis in the Power Bar Graph window of the Code Domain Power view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:RHO:MS:VIEW4:WIND:TRAC:X:RLEV?
Notes	VIEW3 : Code Domain Power View
Preset	0.0
State Saved	Saved in instrument state.
Min	0
Max	32
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RLEVel`
Initial S/W Revision	Prior to A.02.00

X Scale/Div

Sets the horizontal scale by changing a value per division.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, Magnitude Error Window)

Sets the horizontal scale by changing a value per division in the Magnitude Error window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:X:PDIV?

Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	204.7
State Saved	Saved in instrument state.
Min	1.0
Max	5000000.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, Phase Error Window)

Sets the horizontal scale by changing a value per division in the Phase Error window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	204.7
State Saved	Saved in instrument state.
Min	1.0
Max	5000000.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (I/Q Error (Quad) View, EVM Window)

Sets the horizontal scale by changing a value per division in the EVM window of I/Q Error (Quad) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:X:PDIV?
Notes	If the 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. Target window to control depends on the SubOpCode. VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Couplings	See Restriction and Notes
Preset	204.7
State Saved	Saved in instrument state.
Min	1.0
Max	5000000.0
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:X[:SCALe]:PDIVision`
Initial S/W Revision	Prior to A.02.00

X Scale/Div (Code Domain Power View, Power Bar Graph Window)

Sets the horizontal scale by changing a power value per division in the Power Bar Graph window of Code Domain Power View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:RHO:MS:VIEW4:WIND:TRAC:X:PDIV?
Notes	VIEW4: Code Domain Power View
Preset	16.0 for Subtype 0/1 32.0 for Subtype 2/3
State Saved	Saved in instrument state.
Min	1
Max	128
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:X[:SCALe]:PDIVision`

Initial S/W Revision	Prior to A.02.00

X Ref Position

Sets the reference position of the X axis on the display. The reference position can be set to Left, Ctr (Center) or Right.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, Magnitude Error window)

Sets the reference position of the X axis in the Magnitude Error window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:X:RPOS RIGH
Notes	VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, Phase Error window)

Sets the reference position of the X axis in the Phase Error window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:X:RPOS RIGH
Notes	VIEW3 : I/Q Error View

	WINDow[2]: Phase Error Window on I/Q Error View
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (I/Q Error (Quad) view, EVM window)

Sets the reference position of the X axis in the EVM window of the I/Q Error view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:X:RPOS RIGH
Notes	VIEW3 : I/Q Error View WINDow3: EVM Window on I/Q Error View
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

X Ref Position (Code Domain Power view, Power Bar Graph window)

Sets the reference position of the X axis in the Power Bar Graph view of the Code Domain Power view.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTer | RIGHt` `:DISPlay:RHO:MS:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:RHO:MS:VIEW4:WIND:TRAC:X:RPOS RIGH
Notes	VIEW4: Code Domain Power View
Preset	LEFT

State Saved	Saved in instrument state.
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RPOSition`
Initial S/W Revision	Prior to A.02.00

Auto Scaling

Determines the scale per division and reference value for the X axis based on the current measurement results.

Key Path	SPAN X Scale
Initial S/W Revision	Prior to A.02.00

X Auto Scaling (I/Q Error (Quad View) View, Magnitude Error window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in the Magnitude Error view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND:TRAC:X:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[1]: Mag Error Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

X Auto Scaling (I/Q Error (Quad View) View, Phase Error window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in the Phase Error view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND2:TRAC:X:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[2]: Phase Error Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

X Auto Scaling (I/Q Error (Quad View) View, EVM window)

When Auto Scaling is On, and the Restart front panel key is pressed, this function automatically displays the scale per division and reference value results in the EVM view of I/Q Error (Quad View) View.

Key Path	Span X Scale
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle OFF | ON | 0 | 1` `:DISPlay:RHO:MS:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:RHO:MS:VIEW3:WIND3:TRAC:X:COUP ON
Notes	Upon pressing the Restart front-panel key or Restart menu key under the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. VIEW3 : I/Q Error View WINDow[3]: EVM Window on I/Q Error View
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW3:WINDow3:TRACe:X[:SCALe]:COUPle`
Initial S/W Revision	Prior to A.02.00

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.

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

Pause/Resume

This key allows you to pause or resume the measurement of the displayed signal.

See Pause/Resume function.

Key Path	Sweep/Control
Initial S/W Revision	Prior to A.02.00

System

See "System" on page 230

Trace/Detector

There is no Trace/Detector functionality supported in the Modulation Accuracy measurement. The front-panel key will display a blank menu when key pressed.

Key Path	Front Panel key
Initial S/W Revision	Prior to A.02.00

Trigger

See "Trigger" on page 290

Free Run

See "Free Run " on page 297

Video

See "Video (IF Envelope) " on page 1471

Trigger Level

See "Trigger Level " on page 1472

Trig Slope

See "Trig Slope " on page 1473

Trig Delay

See "Trig Delay " on page 300

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

Trig Delay

See "Trig Delay " on page 303

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off " on page 1475

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

Trig Delay

See "Trig Delay " on page 306

Zero Span Delay Comp

See "Zero Span Delay Comp On/Off" on page 1477

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Relative Trigger

See "Relative Trigger Level" on page 1479

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay " on page 310

Periodic Timer

See "Periodic Timer (Frame Trigger) " on page 1481

Period

See "Period " on page 1482

Offset

See "Offset " on page 1483

Offset Adjust (Remote Command Only)

See "Offset Adjust (Remote Command Only)" on page 1484

Reset Offset Display

See "Reset Offset Display " on page 1485

Sync Source

See "Sync Source " on page 1485

Off

See "Off " on page 1486

External 1

See "External 1 " on page 1486

Trigger Level

See "Trigger Level " on page 1486

Trig Slope

See "Trig Slope " on page 1487

External 2

See "External 2 " on page 1488

Trigger Level

See "Trigger Level " on page 1488

Trig Slope

See "Trig Slope " on page 1489

RF Burst

See "RF Burst " on page 1489

Absolute Trigger

See "Absolute Trigger Level" on page 1490

Trig Slope

See "Trigger Slope " on page 1491

Trig Delay

See "Trig Delay" on page 321

Auto/Holdoff

See "Auto/Holdoff " on page 1492

Auto Trig

See "Auto Trig " on page 1492

Trig Holdoff

See "Trig Holdoff " on page 1493

Holdoff Type

See ___ on page X

Internal

See "Internal" on page 323

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

NOTE In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	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. 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. 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. User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.
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.

See "View Selection (Remote Command only)" on page 2091

See "View Selection by number (Remote Command only)" on page 2092

This measurement consists of four views. Some views display multiple windows. For more information about a specific view, see the following:

The default view is I/Q Measured Polar Graph (left/right).

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

View Selection (Remote Command only)

Selects the desired measurement view from the following selections:

- POLar – provides a combination view of I/Q measured polar vector graph and the summary data.
- TABLe – Provides a table of magnitude error, phase error, EVM, and the modulation accuracy summary data such as rho, peak and rms EVM, peak Modulation Accuracy (Rho) error, magnitude error, phase error, and so forth in a text window, in terms of averaged and detected peak/maximum value in the average cycle.
- ERRor – provides a combination view of a magnitude error, phase error, EVM graphs and one-slot result summary of selected channel.
- CDPower – provides a combination view of the code domain power graph and the summary table of code domain channel.

Key Path	View/Display
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW[:SELect] POLar|ERRor|TABLe|CDPower` `:DISPlay:RHO:MS:VIEW[:SELect]?`
Example	:DISP:RHO:MS:VIEW TABL
Notes	Meaning of the numeric values: 1: I/Q Measured Polar Graph View 2: Peak/Avg Metrics View 3. I/Q Error (Quad View) View 4: Code Domain Power View
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Measured Polar Graph | Peak/Avg Metrics | I/Q Error (Quad View) | Code Domain Power
Backwards	`:DISPlay:TRHO:VIEW[:SELect]`

Compatibility SCPI	
Initial S/W Revision	Prior to A.02.00

View Selection by number (Remote Command only)

Displays the numeric values of the measurement results. This function is available by SCPI command only.

Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:VIEW:NSELect <integer>` `:DISPlay:RHO:MS:VIEW:NSELect?`
Example	DISP:RHO:MS:VIEW:NSEL 2 DISP:RHO:MS:VIEW:NSEL?
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	4
Backwards Compatibility SCPI	`:DISPlay:TRHO:VIEW:NSELect`
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

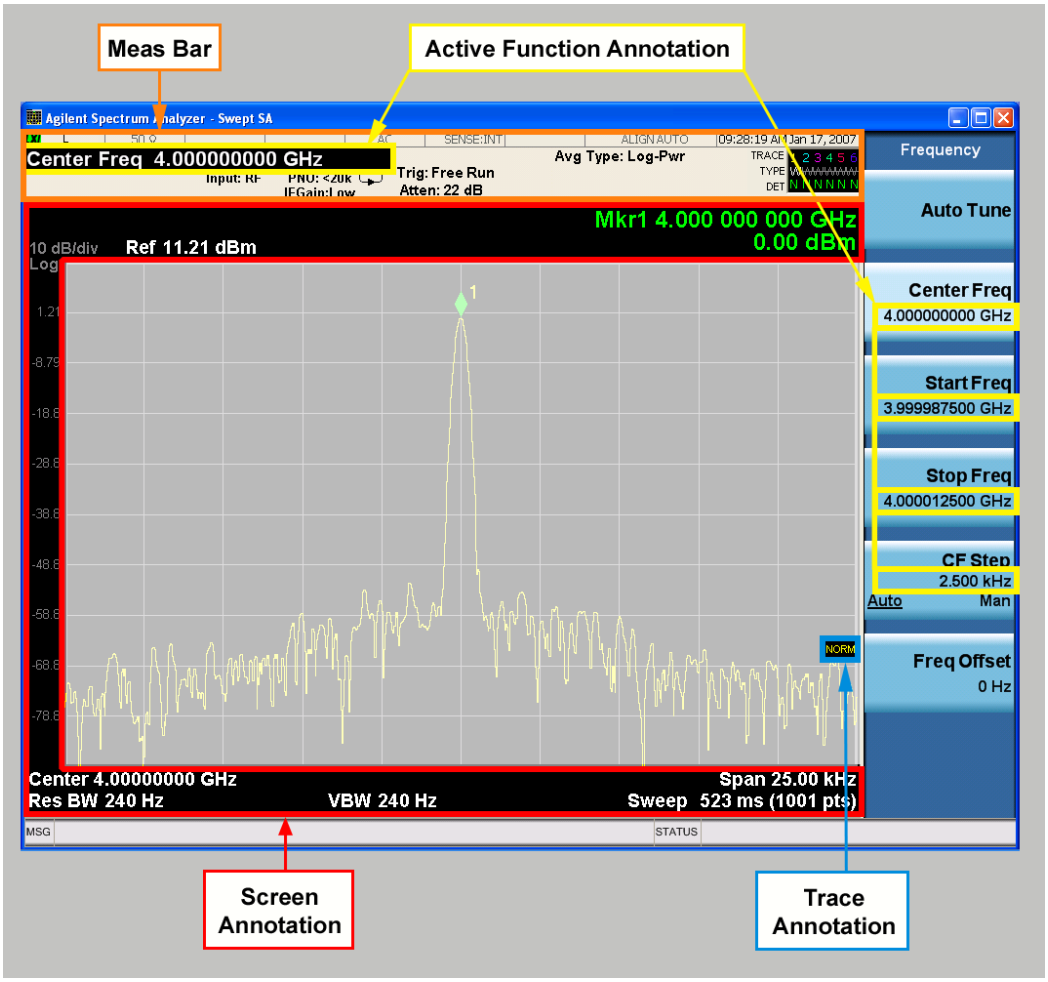
Annotation

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

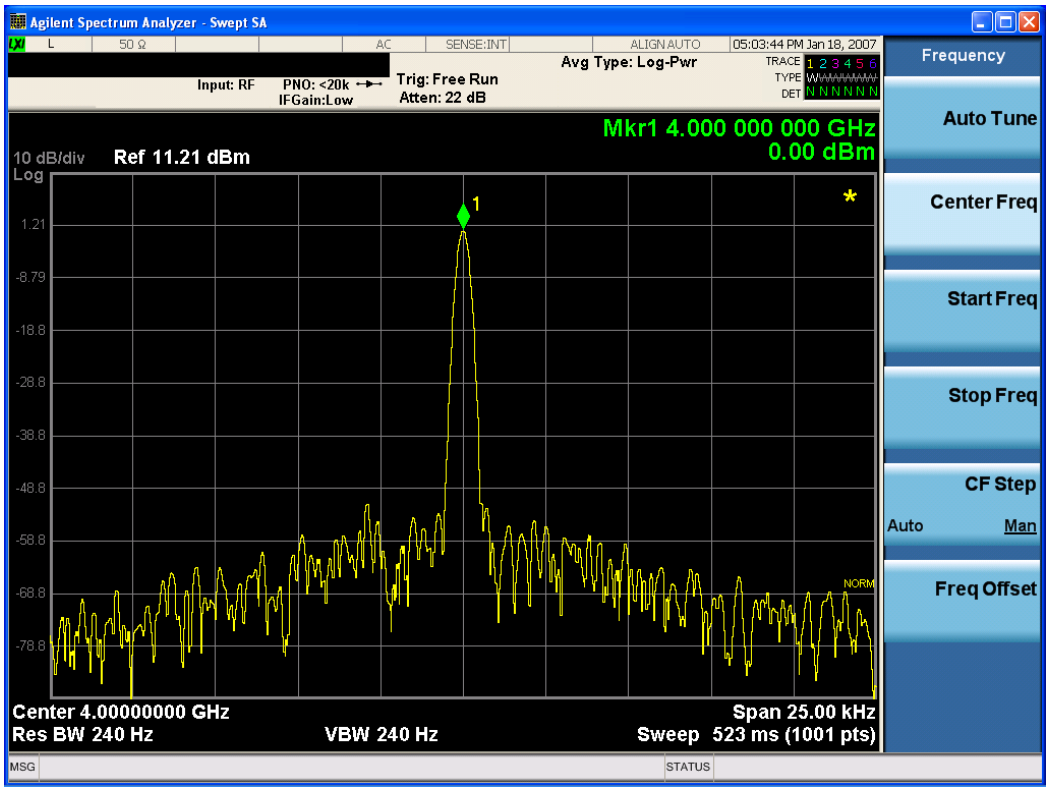
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the 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: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

I/Q Measured Polar Graph

Provides a combination view of I/Q measured polar vector graph and the summary data.

There are two windows:

- "I/Q Measured Polar Vector window" on page 2100
- "Metrics window" on page 2100

The result on the Metrics is not averaged result but single measurement result when average set to ON.

Slot number shows in I/Q Measured Polar Vector window.

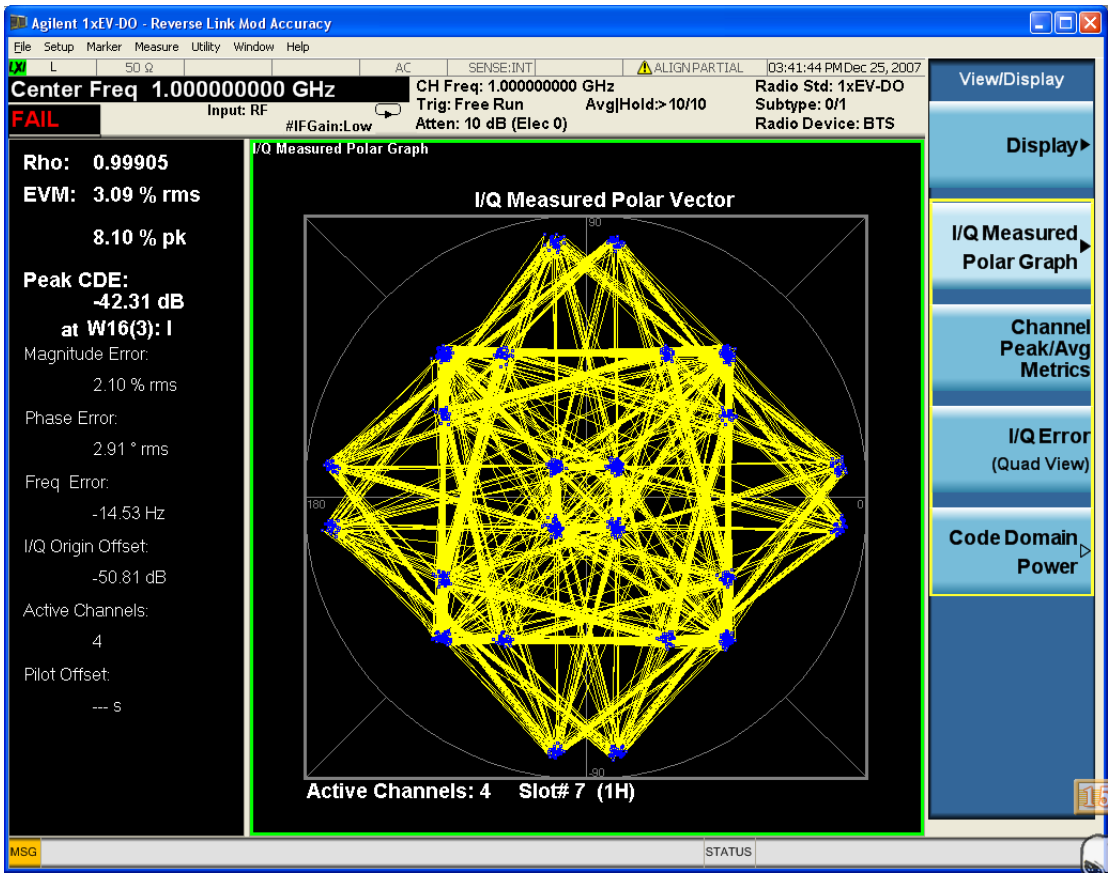


Figure 0-1 I/Q Measured Polar Graph View

I/Q Measured Polar Vector window

Shows code domain power.

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=5)

Metrics window

Parameter Name	Corresponding Results	Display Format
Slot Number	n=1 20th	99 (xx) xx: 1H, 2H
Rho	n=11 7th rho	9.99999
EVM (rms)	n=11 1st EVM over the entire measurement area	99.99 % rms
EVM (pk)	n=11 2nd	99.99 % pk

	peak EVM in the measurement area	
Pk CDE (dB)	n=11 8th Peak Code Domain Error relative to the mean power	–99.99 dB
Pk CDE (Ch No.)	n=11 9th Channel number in which the peak code domain error is detected.	WX(Y):Phase X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1) Phase: I or Q
Magnitude Error	n=11 3rd Average magnitude error over the entire measurement area	99.99 % rms
Phase Error	n=11 4th Average phase error over the entire measurement area	99.99 °rms
Freq Error	n=11 6th Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=11 5th I and Q error (magnitude squared) offset from the origin.	–99.99 dB
Active Channels	n=11 10th Number of Active channels	9
Pilot Offset	n=11 11th Pilot phase timing from the acquisition trigger point.	9999.99 us

Key Path	View/Display
Example	:DISP:RHO:MS:VIEW POL
Initial S/W Revision	Prior to A.02.00

I/Q Polar Vector/Constellation

Sets IQ Polar graph display mode from Vector & Constellation, Vector and Constellation. This key appears when I/Q Polar Graph window is active.

- VCONstln – Vector & Constellation
- VECTor - Vector
- CONStln - Constellation

Key Path	View/Display – I/Q Measured Polar Graph, I/Q Polar
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:IQPType VCONstln|VECTor|CONStln` `:DISPlay:RHO:MS:IQPType?`
Example	:DISP:RHO:MS:IQPT VCON
Notes	VIEW1: I/Q Measured Polar Graph View WIND2: I/Q Polar graph window
Preset	VCONslln
State Saved	Saved in instrument state.
Range	Vec & Constln | Vector | Constellation
Initial S/W Revision	Prior to A.02.00

Chip Offset

Sets display trace length in IQ Polar Graph in chips.

Key Path	View/Display – I/Q Measured Polar Graph, Chip Offset
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:OFFSet <integer>` `:DISPlay:RHO:MS:OFFSet?`
Example	:DISPlay:RHO:MS:OFFS 10
Notes	Maximum varies so that (Chip Offset + I/Q Chips) does not exceed 1024 chips. VIEW1: I/Q Measured Polar Graph View WIND2: I/Q Polar graph window
Couplings	When (Chip Offset + I/Q Chips) exceeds 1024, Chip Offset is changed to keep it 1023.
Preset	0
State Saved	Saved in instrument state.
Range	0 to 1023
Min	0
Max	1023
Initial S/W Revision	Prior to A.02.00

I/Q Chips

Sets display trace length in IQ Polar Graph in chips.

Key Path	View/Display – I/Q Measured Polar Graph, I/Q Chips
Mode	1xEVDO

Remote Command	`:DISPlay:RHO:MS:IQCHips <integer>` `:DISPlay:RHO:MS:IQCHips?`
Example	:DISPlay:RHO:MS:IQCH 1000
Notes	VIEW1: I/Q Measured Polar Graph View WIND2: I/Q Polar graph window
Couplings	When (Chip Offset + I/Q Chips) exceeds 1024, Chip Offset is changed to keep it 1024.
Preset	1024
State Saved	Saved in instrument state.
Range	1 to 1024
Min	1
Max	1024
Initial S/W Revision	Prior to A.02.00

+45° Rotation

Allows you to toggle the 45 Degree Rotation of the trace on IQ Polar Graph. When On, the trace plotted on IQ Polar Graph is rotated by +45 degree. This setting affects display of the trace but not trace returned from RUI.

Key Path	View/Display – I/Q Measured Polar Graph, +45° Rot
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:ROTQpi[:STATe] 0|1|OFF|ON` `:DISPlay:RHO:MS:ROTQpi[:STATe]?`
Example	:DISPlay:RHO:MS:ROTQ ON
Notes	VIEW1: I/Q Measured Polar Graph View WIND2: I/Q Polar graph window
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Full Vector(Background)

Allows you to toggle the Full Vector display. Full Vector is a trace plotted on IQ Polar graph using the same IQ data plotted on the graph. Full trace data is always drew with gray line behind the normal plot which is drawn with yellow line and/or blue dots. Full Vector provides the user an intuitive sense of relative magnitude of plotted IQ measured data which is specified by I/Q Chips and Chip Offset.

Key Path	View/Display – I/Q Measured Polar Graph, Full Vector

Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:FVECtor[:STATe] 0|1|OFF|ON` `:DISPlay:RHO:MS:FVECtor[:STATe]?`
Example	:DISPlay:RHO:MS:FVEC ON
Notes	VIEW1: I/Q Measured Polar Graph View WIND2: I/Q Polar graph window
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Interpolation

This key specifies whether the input I/Q data should be interpolated.

Key Path	View/Display – I/Q Measured Polar Graph, Interpolation
Mode	1xEVDO
Remote Command	`:DISPlay:RHO:MS:INTerpolate OFF|ON|0|1` `:DISPlay:RHO:MS:INTerpolate?`
Example	:DISP:RHO:MS:INT ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Initial S/W Revision	Prior to A.02.00

Peak/Avg Metrics

Provides a table of magnitude error, phase error, EVM, and the modulation accuracy summary data such as rho, peak and rms EVM, peak Modulation Accuracy (Rho) error, magnitude error, phase error, and so forth in a text window, in terms of averaged and detected peak/maximum value in the average cycle.

- Average : The value averaged in average cycle
- Peak Hold : The value detected and hold as Peak/Maximum in average cycle

In this view, “F” shows failure to setting limit.

Example	:DISP:RHO:MS:VIEW TABL
Initial S/W Revision	Prior to A.02.00

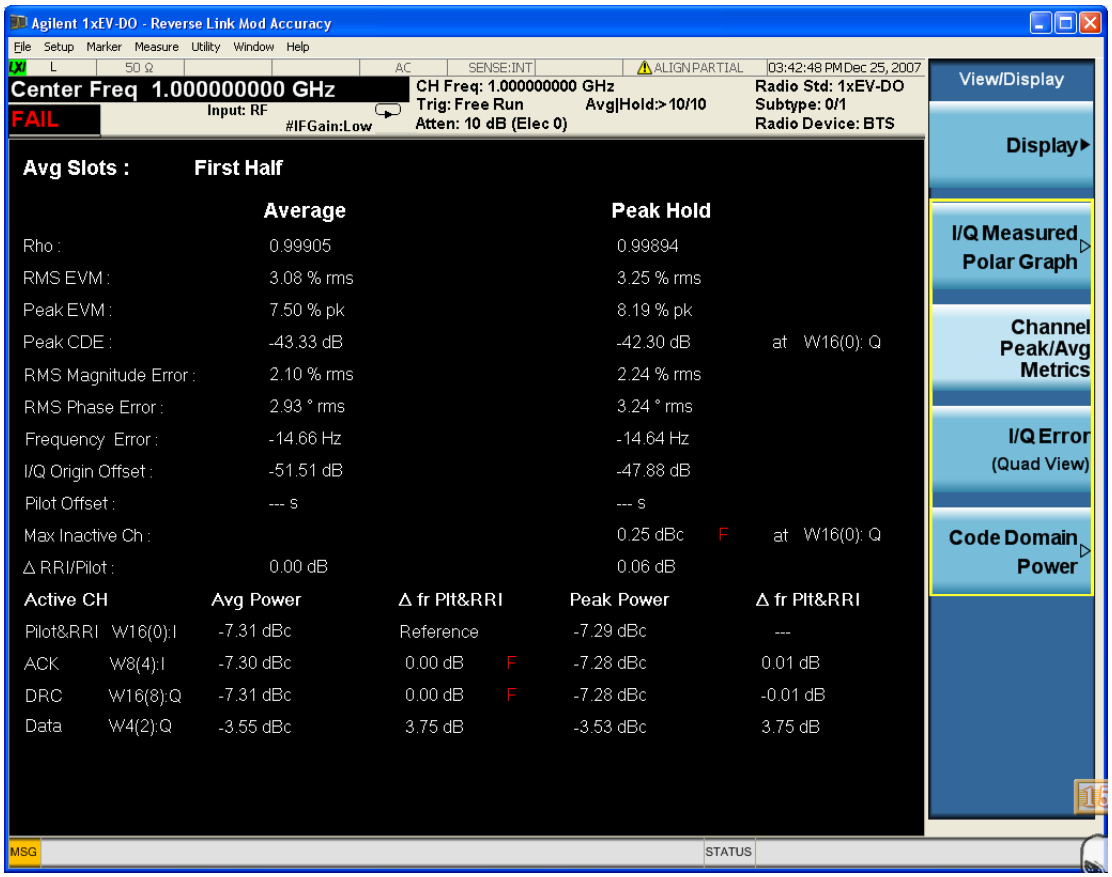


Figure 0-2 Peak/Avg Metrics View(Subtype0/1)

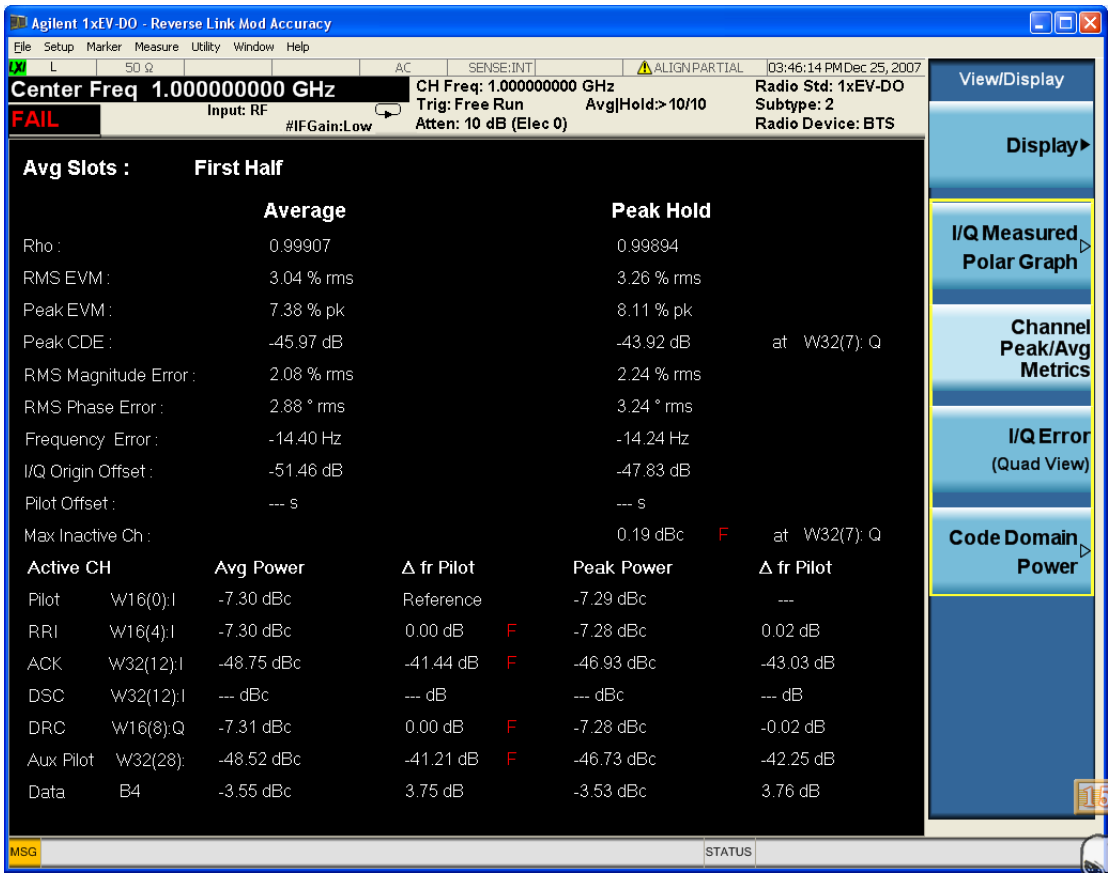


Figure 0-3 Peak/Avg Metrics View(Subtype2/3)

Parameter Name	Corresponding Results	Display Format
Rho	n=1 7th and n=9 7th (Average) n=10 7th (Peak Hold) rho	9.99999
RMS EVM	n=1 1st and n=9 1st (Average) n=10 1st (Peak Hold) EVM over the entire measurement area	99.99 %
Peak EVM	n=9 2nd (Average) n=1 2nd and n=10 2nd (Peak Hold) Peak EVM in the measurement area	99.99 %
Peak CDE	n=9 8th (Average) n=1 8th and n=10 8th (Peak Hold) Peak Code Domain Error relative to the mean power	99.99 dB
Pk CDE (Ch No.)	n=1 9th and n=10 9th The channel number in which the peak code domain error is detected.	WX(Y):Phase X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps

		Y: Walsh code number (0 .. X–1) Phase: I or Q
RMS Magnitude Error	n=1 3rd and n=9 3rd (Average) n=10 3rd (Peak Hold) Magnitude error over the entire measurement area	99.99 % rms
RMS Phase Error	n=1 4th and n=9 4th (Average) n=10 4th (Peak Hold) Phase error over the entire measurement area	99.99 °rms
Freq Error	n=1 6th and n=9 6th (Average) n=10 6th (Peak Hold) Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=1 5th and n=9 5th (Average) n=10 5th (Peak Hold) I and Q error (magnitude squared) offset from the origin	99.99 dB
Pilot Offset	n=1 11th and n=9 11th (Average) n=10 11th (Peak Hold) Pilot phase timing from the acquisition trigger point.	9999.99 us
Max Inactive Ch (dB)	n=1 12th and n=10 12th Max Inactive Code Domain power	99.99 dBc
Pilot & RRI Power (Subtype 0/1)	n=9 29th (Average) n=10 29th (Peak Hold) Pilot Power	99.99 dB
Pilot Power (Subtype 2/3)	n=9 13th (Average) n=10 13th (Peak Hold) Pilot Power	99.99 dB
RRI Channel Power	n=9 14th (Average) n=10 14th (Peak Hold) RRI Channel Power	99.99 dB
ΔRRI/Pilot (Subtype 0/1)	n=1 13th and n=9 15th (Average) n=10 15th (Peak Hold) RRI ch relative power to Pilot Ch	99.99 dB
RRI Channel Relative Power to Pilot (Subtype 2/3)	n=1 13th and n=9 15th (Average) n=10 15th (Peak Hold) RRI ch relative power to Pilot Ch	99.99 dB
ACK Channel Power	n=9 18th (Average) n=10 18th (Peak Hold) ACK Channel Power	99.99 dB

ACK Channel Relative Power to Pilot	n=1 14th and n=9 19th (Average) n=10 19th (Peak Hold) ACK ch relative power to Pilot Ch	99.99 dB
DSC Channel Power	n=9 30th (Average) n=10 30th (Peak Hold) DSC Channel Power	99.99 dB
DSC Channel Relative Power to Pilot	n=1 22nd and n=9 31st (Average) n=10 31st (Peak Hold) DSC ch relative power to Pilot Ch	99.99 dB
DRC Channel Power	n=9 16th (Average) n=10 16th (Peak Hold) DRC Channel Power	99.99 dB
DRC Channel Relative Power to Pilot	n=1 15th and n=9 17th (Average) n=10 17th (Peak Hold) DRC ch relative power to Pilot Ch	99.99 dB
Data Channel Power (W4 (2))	n=9 20th (Average) n=10 20th (Peak Hold) DataChannel Power on W4(2)	99.99 dB
Data Channel Relative Power (W4(2))to Pilot	n=1 16th and n=9 21st (Average) n=10 21st (Peak Hold) Data ch relative power on W4(2) to Pilot Ch	99.99 dB
Data Channel Power (W2 (1))	n=9 20th (Average) n=10 20th (Peak Hold) Data Channel Power on W2(1)	99.99 dB
Data Channel Relative Power (W2(1))to Pilot	n=1 16th and n=9 21st (Average) n=10 21st (Peak Hold) Data ch relative power on W2(1)to Pilot Ch	99.99 dB
Auxiliary Pilot Channel Power	n=9 26th (Average) n=10 26th (Peak Hold) Auxiliary Pilot Channel Power	99.99 dB
Auxiliary Pilot Channel Relative Power to Pilot	n=1 19th and n=9 27th (Average) n=10 27th (Peak Hold) Auxiliary Pilot ch relative power to Pilot Ch	99.99 dB

I/Q Error (Quad View)

Provides a combination view of a magnitude error, phase error, EVM graphs and one-slot result summary of selected channel.

There are four windows:

- "Magnitude Error window" on page 2109 (upper left)
- "Phase Error window" on page 2109 (upper right)
- "EVM Window" on page 2110 (lower left)
- "Metrics Window" on page 2110 (lower right)

Magnitude Error, Phase Error and Symbol EVM always show 1 slot result. The highlighted half slot by two vertical lines indicates selected half slot by Meas Offset.

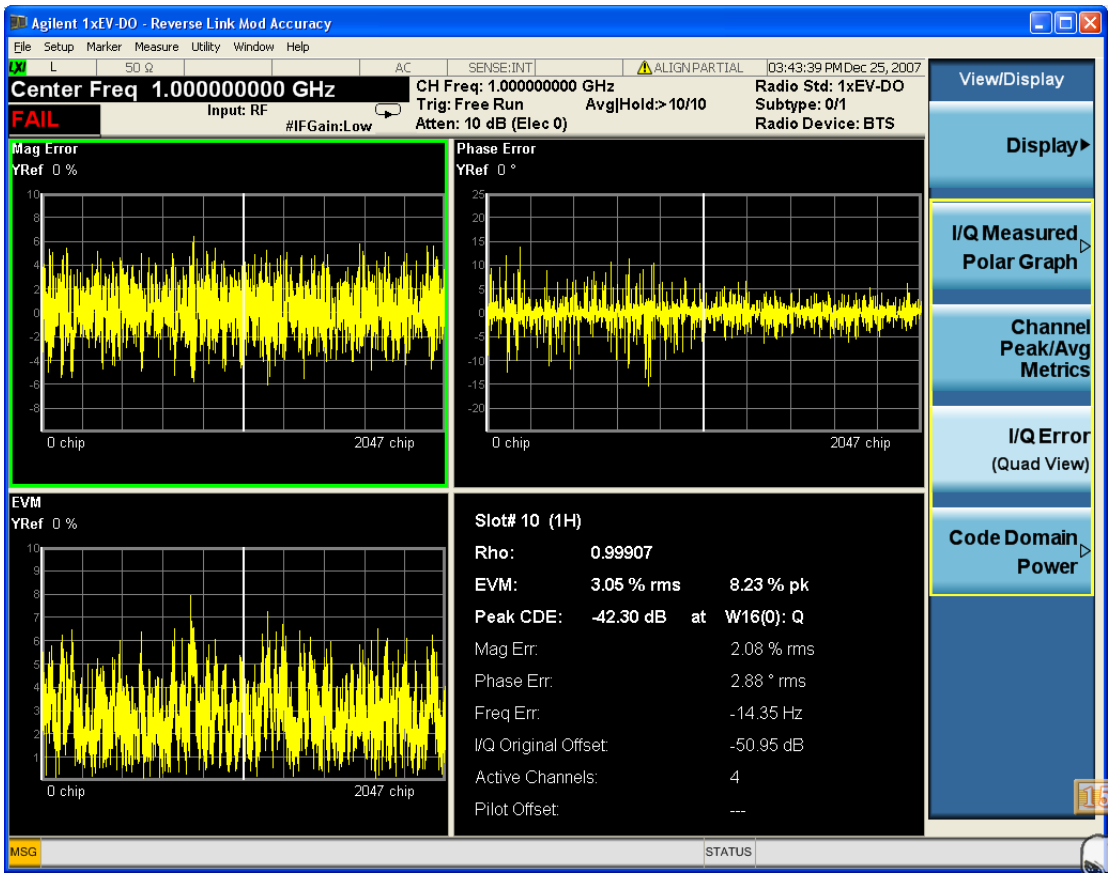


Figure 0-4 I/Q Error View

Magnitude Error window

Marker Operation	Yes
Corresponding Trace	MERRor (n=3)

Phase Error window

Marker Operation	Yes
Corresponding Trace	PERRor (n=4)

EVM Window

Marker Operation	Yes
Corresponding Trace	EVM (n=2)

Metrics Window

Parameter Name	Corresponding Results	Display Format
Rho	n=1 7th rho	9.99999
EVM (rms)	n=11 1st EVM over the entire measurement area	99.99 % rms
EVM (pk)	n=11 2nd peak EVM in the measurement area	99.99 % pk
Pk CDE (dB)	n=11 8th Peak Code Domain Error relative to the mean power	–99.99 dB
Pk CDE (Ch No.)	n=11 9th Channel number in which the peak code domain error is detected.	WX(Y):Phase X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1) Phase: I or Q
Magnitude Error	n=11 3rd Average magnitude error over the entire measurement area	99.99 % rms
Phase Error	n=11 4th Average phase error over the entire measurement area	99.99 °rms
Freq Error	n=11 6th Frequency error in the measured signal	99.99 Hz
I/Q Origin Offset	n=11 5th I and Q error (magnitude squared) offset from the origin.	–99.99 dB
Active Channels	n=11 10th Number of Active channels	9
Pilot Offset	n=11 11th Pilot phase timing from the acquisition trigger point.	9999.99 us

Example	:DISP:RHO:MS:VIEW ERR
Initial S/W Revision	Prior to A.02.00

Code Domain Power

Provides a combination view of the code domain power graph and the summary table of code domain channel.

There are two windows:

- "Code Domain Power Graph window" on page 2112 (upper)
- "Metrics window" on page 2112 (lower)

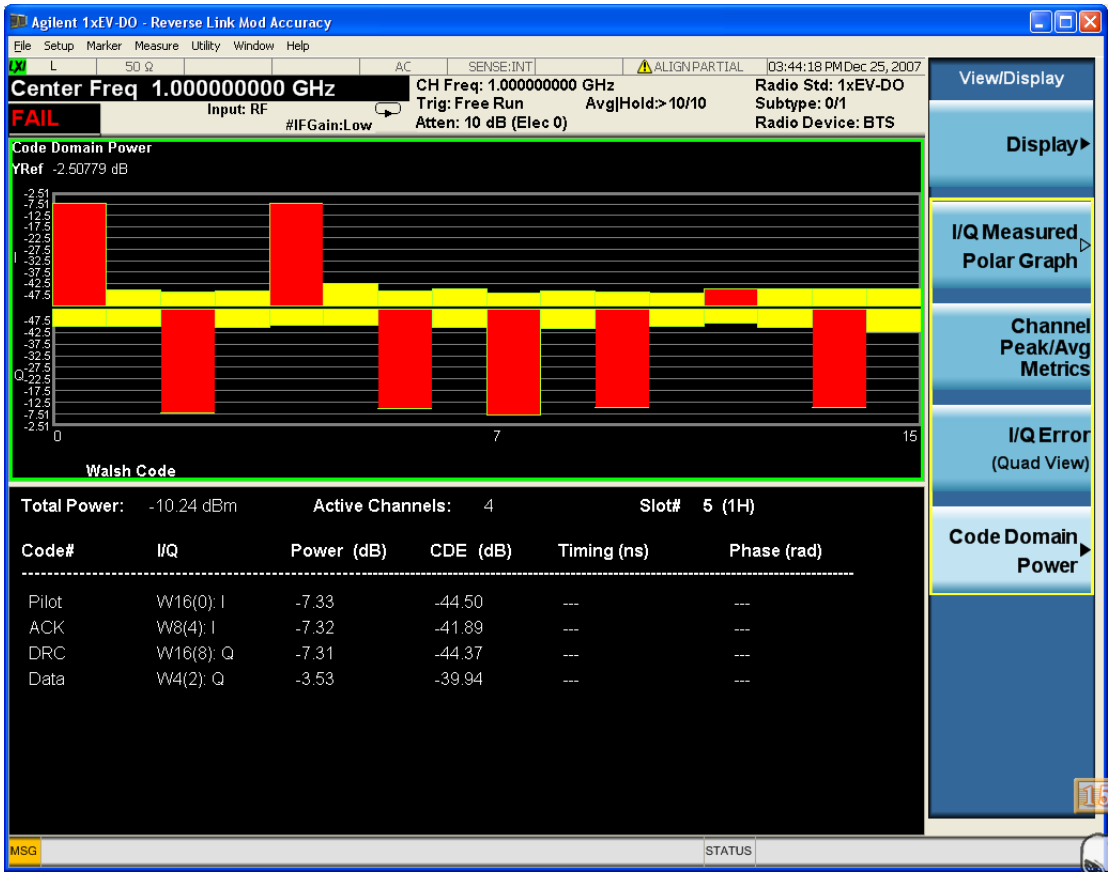


Figure 0-5 Code Domain Power View(Subtype0/1)

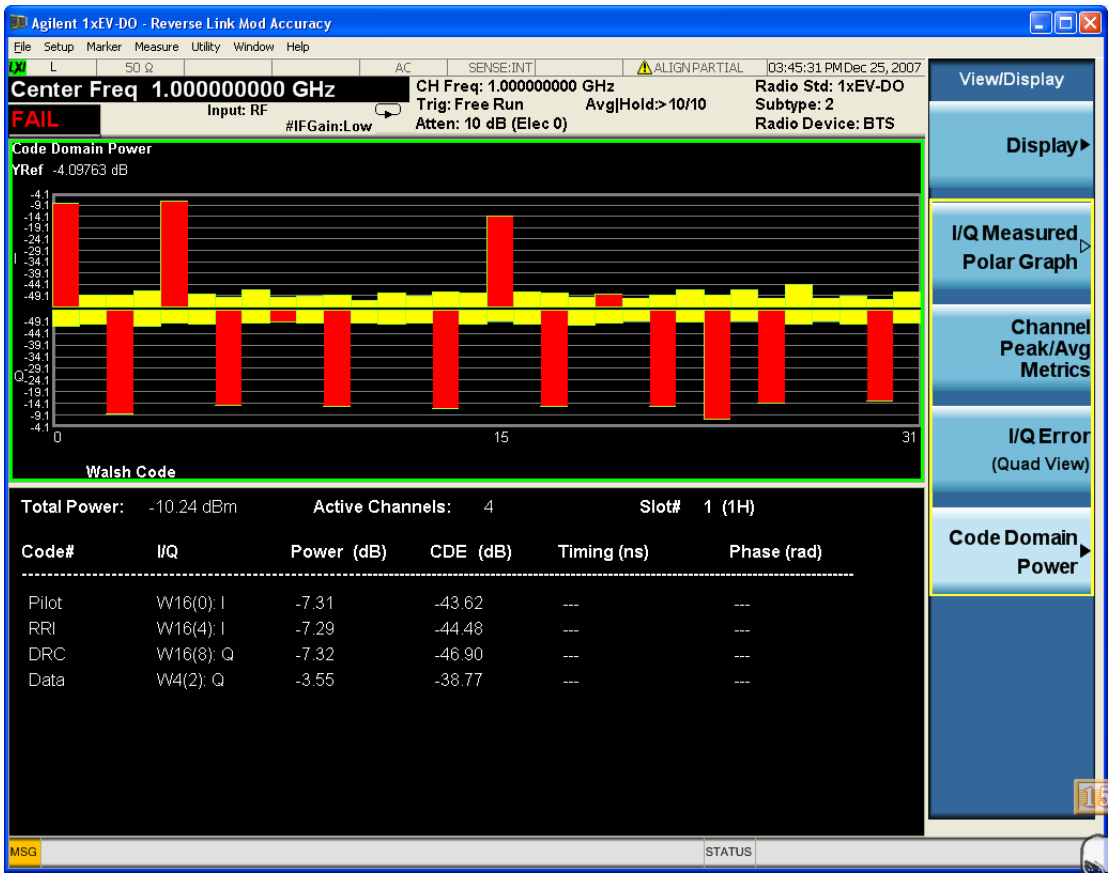


Figure 0-6 Code Domain Power View(Subtype2/3)

Code Domain Power Graph window

Code domain power is calculated based on base code length 16 for Subtype 0/1, or 32 for Subtype 2/3.

Marker Operation	Yes
Corresponding Trace	CDP (n=8)

These traces and scalar results are of the slot specified by Meas Offset.

Metrics window

Parameter Name	Corresponding Results	Display Format
Total Power	n=11 12th Absolute Total Power of slot	99.99 dBm
Slot	n=1 20th First slot number	9
Active Channels	n=11 10th Number of Active Channels	99

Code Number	n=7	WX(Y) X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1)
I/Q	n=7 Either +1 (I) or –1 (Q) or 0 (I and Q) for Nth Active Channel	I or Q
Power (dB)	n=7 Power Level (in dB) for n th Active Channel	99.99
CDE (dB)	n=7 Code Domain Error for n th Active Channel. CDE is calculated using the property (I phase only, Q phase only or I and Q phase) of the active channel.	99.99
Timing (ns)	n=7 Timing from Pilot Channel	9.99
Phase (rad)	n=7 Phase from Pilot Channel	9.999

Example	:DISP:RHO:MS:VIEW CDP
Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Code Domain Power
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:RHO:MS:WCODe:ORDer?`
Example	:CALC:RHO:MS:WCOD:ORD BREV
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard|Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TRHO:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggle the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker
Mode	1xEVDO
Remote Command	`DISPlay:RHO:MS:MARKer:CONSolidated ON|OFF|1|0` `DISPlay:RHO:MS:MARKer:CONSolidated?`
Example	DISPlay:RHO:MS:MARKer:CONSolidated ON DISPlay:RHO:MS:MARKer:CONSolidated?
Notes	This softkey is displayed only when the CDP window is selected. This key shall be grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`DISPlay:TRHO:MARKer:CONSolidated`
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively. In the graph, the red bar denotes active channel, while the yellow bar denotes inactive channel.

Figure 0-7 Code Domain Power when I/Q Combined Power Bar is set to ON

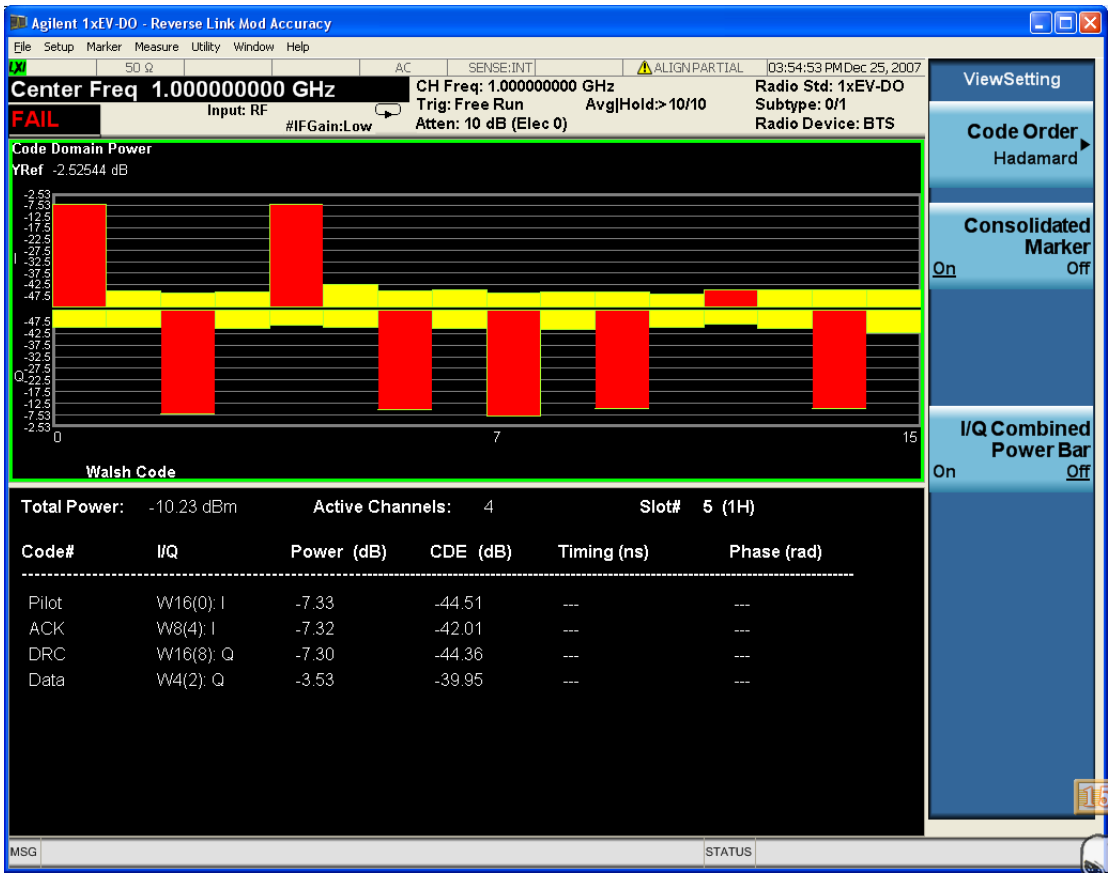


Figure 0-8 Code Domain Power when I/Q Combined Power Bar is set to OFF

Key Path	View/Display, Code Domain Power, I/Q Combined Power
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:IQ:COMBined[:STATe] 0|1|OFF|ON` `:CALCulate:RHO:MS:IQ:COMBined[:STATe]?`
Example	:CALC:RHO:MS:IQ:COMB ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	`:CALCulate:TRHO:IQ:COMBined[:STATe]`
Initial S/W Revision	Prior to A.02.00

Code Domain Power

Provides a combination view of the code domain power graph and the summary table of code domain channel.

There are two windows:

- "Code Domain Power Graph window" on page 2118 (upper)
- "Metrics window" on page 2118 (lower)

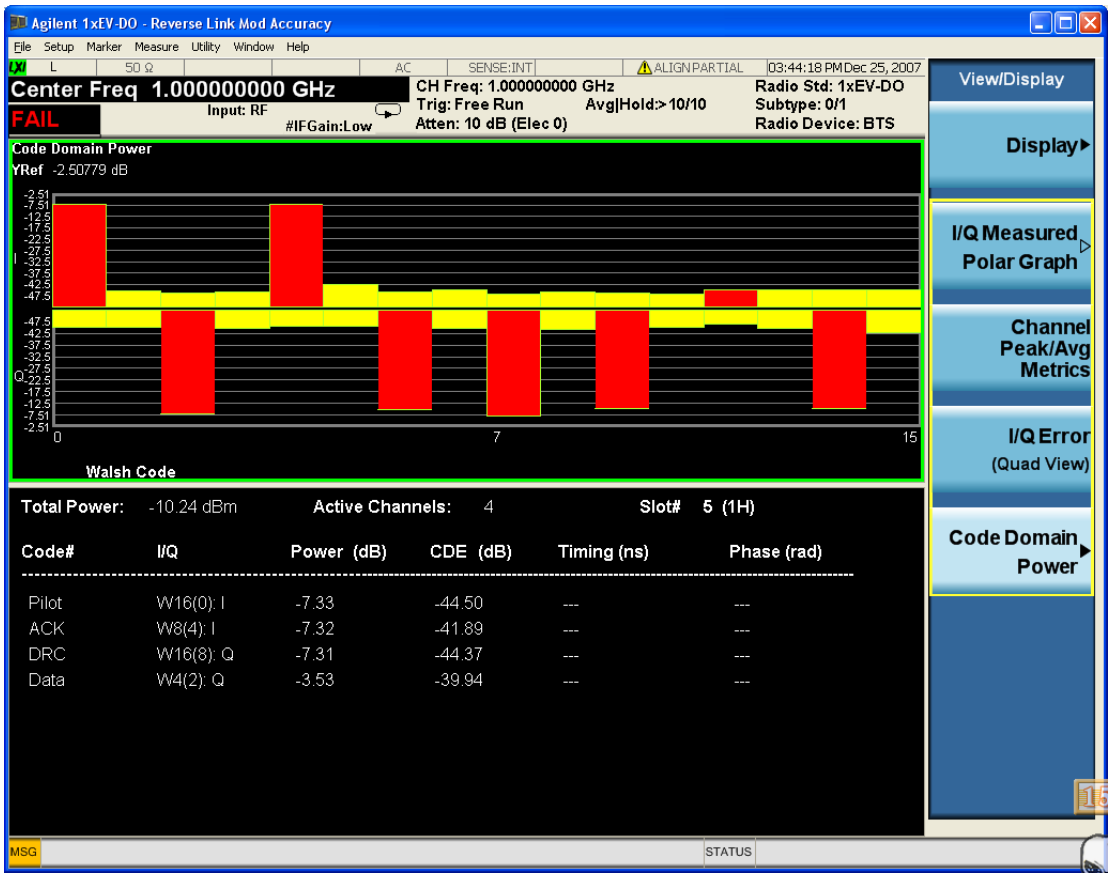


Figure 0-5 Code Domain Power View(Subtype0/1)

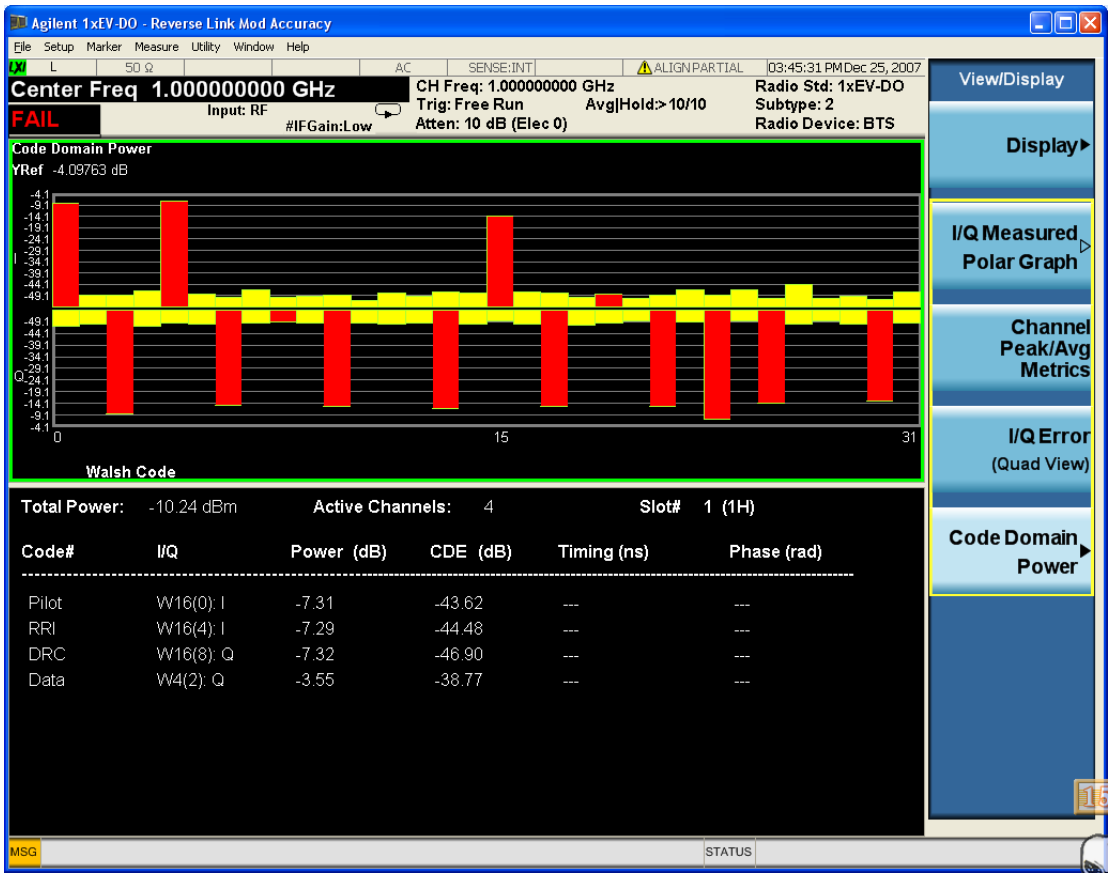


Figure 0-6 Code Domain Power View(Subtype2/3)

Code Domain Power Graph window

Code domain power is calculated based on base code length 16 for Subtype 0/1, or 32 for Subtype 2/3.

Marker Operation	Yes
Corresponding Trace	CDP (n=8)

These traces and scalar results are of the slot specified by Meas Offset.

Metrics window

Parameter Name	Corresponding Results	Display Format
Total Power	n=11 12th Absolute Total Power of slot	99.99 dBm
Slot	n=1 20th First slot number	9
Active Channels	n=11 10th Number of Active Channels	99

Code Number	n=7	WX(Y) X: Walsh Code length (2 .. 32) 2: 614.4ksps ... 32:38.4ksps Y: Walsh code number (0 .. X–1)
I/Q	n=7 Either +1 (I) or –1 (Q) or 0 (I and Q) for Nth Active Channel	I or Q
Power (dB)	n=7 Power Level (in dB) for n th Active Channel	99.99
CDE (dB)	n=7 Code Domain Error for n th Active Channel. CDE is calculated using the property (I phase only, Q phase only or I and Q phase) of the active channel.	99.99
Timing (ns)	n=7 Timing from Pilot Channel	9.99
Phase (rad)	n=7 Phase from Pilot Channel	9.999

Example	:DISP:RHO:MS:VIEW CDP
Initial S/W Revision	Prior to A.02.00

Code Order

Sets the Walsh code order, Hadamard or Bit Reverse.

Key Path	View/Display, Code Domain Power
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:WCODe:ORDer HADamard|BREVerse` `:CALCulate:RHO:MS:WCODe:ORDer?`
Example	:CALC:RHO:MS:WCOD:ORD BREV
Preset	HADamard
State Saved	Saved in instrument state.
Range	Hadamard|Bit Reverse
Backwards Compatibility SCPI	`:CALCulate:TRHO:WCODe:ORDer`
Initial S/W Revision	Prior to A.02.00

I/Q Combined Power Bar

Allows you to toggle the I/Q combined power display function between On and Off. If set to On, the I and Q power bars are consolidated on the upper side of the horizontal axis. If set to Off, the I and Q power bars are shown on the upper side and the lower side of the horizontal axis, respectively. In the graph, the red bar denotes active channel, while the yellow bar denotes inactive channel.

Figure 0-7 Code Domain Power when I/Q Combined Power Bar is set to ON

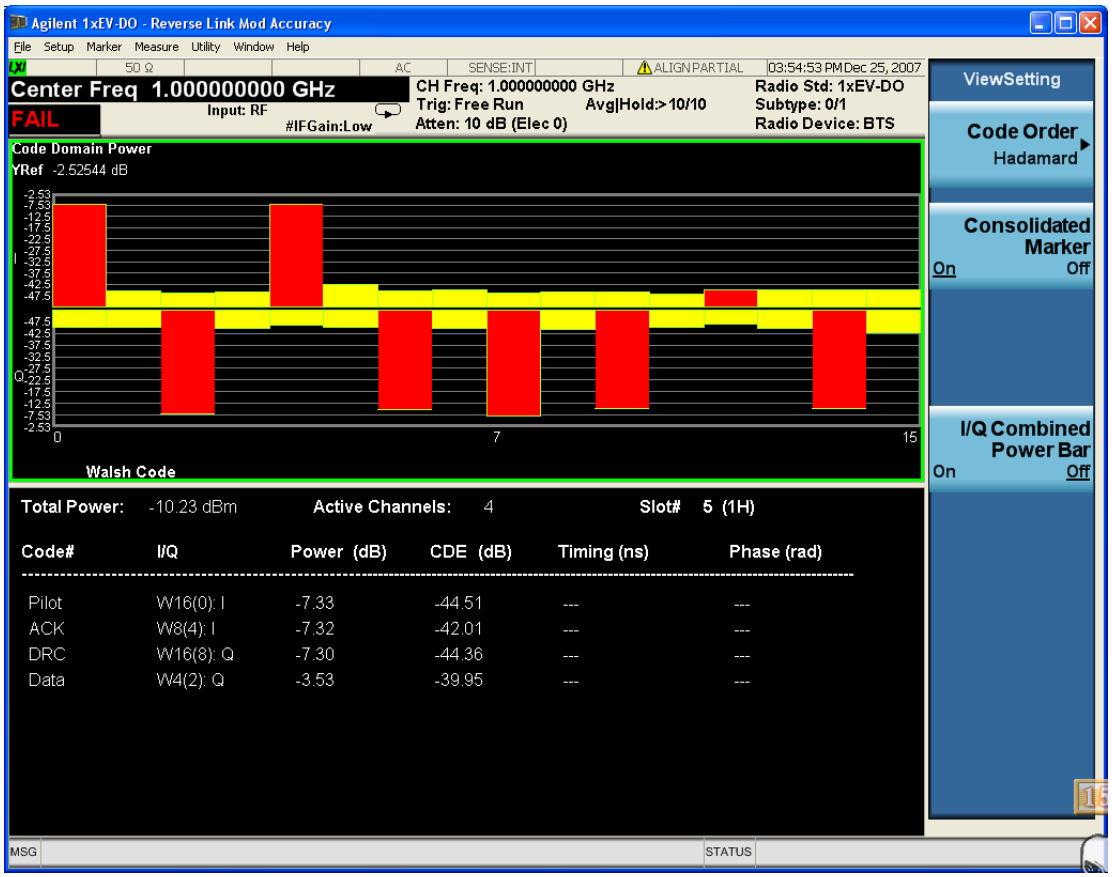


Figure 0-8 Code Domain Power when I/Q Combined Power Bar is set to OFF

Key Path	View/Display, Code Domain Power, I/Q Combined Power
Mode	1xEVDO
Remote Command	`:CALCulate:RHO:MS:IQ:COMBined[:STATe] 0|1|OFF|ON` `:CALCulate:RHO:MS:IQ:COMBined[:STATe]?`
Example	:CALC:RHO:MS:IQ:COMB ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Backwards Compatibility SCPI	`:CALCulate:TRHO:IQ:COMBined[:STATe]`
Initial S/W Revision	Prior to A.02.00

Consolidated Marker

Toggle the consolidated marker function between On and Off.

Key Path	View/Display, Code Domain Power, Consolidated Marker
Mode	1xEVDO
Remote Command	`DISPlay:RHO:MS:MARKer:CONSolidated ON|OFF|1|0` `DISPlay:RHO:MS:MARKer:CONSolidated?`
Example	DISPlay:RHO:MS:MARKer:CONSolidated ON DISPlay:RHO:MS:MARKer:CONSolidated?
Notes	This softkey is displayed only when the CDP window is selected. This key shall be grayed out when the Code Order Bit Reverse key is selected. If set to On, the corresponding Walsh code channel power will be marked in the different color upon placing the marker at the consolidated Walsh code channel power
Preset	ON
State Saved	Saved in instrument state.
Range	Off|On
Backwards Compatibility SCPI	`DISPlay:TRHO:MARKer:CONSolidated`
Initial S/W Revision	Prior to A.02.00

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