User's and Programmer's Reference
N9071A GSM/EDGE Measurement Application

For use with the N9020A MXA Signal Analyzer and N9010A EXA Signal Analyzer

Manufacturing Part Number: N9071-90002

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:CALCulate:WAVeform:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:TRACe RFENvelope | IQ 907

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:CALCulate:WAVeform:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:X <time> 903

:CALCulate:WAVeform:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:X:POSition <real> 904

:CALCulate:WAVeform:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:X:POSition? 904

:CALCulate:WAVeform:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:X? 903

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:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom. 650

:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition? 650

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[:SENSe]RECording:PLAYback:STARt <time> 352
[:SENSe]RECording:PLAYback:STARt:AUTO OFF | ON | 0 | 1 352
[:SENSe]RECording:PLAYback:STARt:AUTO? 352
[:SENSe]RECording:PLAYback:STARt? 352
[:SENSe]RECording:PLAYback:STOP <time> 352
[:SENSe]RECording:PLAYback:STOP:AUTO OFF | ON | 0 | 1 352
[:SENSe]RECording:PLAYback:STOP:AUTO? 352

[:SENSe]RECording:PLAYback:STOP? 352

DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON | OFF | 1 | 0 408

DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]? 408

DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON | OFF | 1 | 0 409

DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]? 409

TRIGger:WAVeform[:SEQuence]:SOURce EXTernal[1] | EXTernal2 | IMMediate | LINE | FRAMe | RF-Burst | VIDeoTRIGger:WAVeform:SOURce? 900

1 Introduction

This document provides information on using the GSM/EDGE Mode in the Agilent Signal Analyzer.

What Does GSM/EDGE Mode Do?

This Mode includes eleven measurements.

1. Burst Power
2. GMSK Power vs. Time
3. GMSK Phase & Frequency
4. GMSK Output RF Spectrum
5. GSMK Transmit Band Spur
6. EDGE Power vs. Time
7. EDGE EVM
8. EDGE RF Output Spectrum
9. EDGE Transmit Band Spur
10. Monitor Spectrum
11. Waveform

Installing Application Software

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

So when you purchase an application, you will receive an entitlement certificate that is used to obtain a license key for that particular measurement application. Enter the license key that you obtain into the N9020A Signal Analyzer to activate the new measurement application. See below for more information.

For the latest information on Agilent Signal Analyzer measurement applications and upgrade kits, visit the following internet URL.

http://www.agilent.com/find/sa_upgrades

Viewing a License Key

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

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

Press **System**, **More**, **Licensing. . .** to view the license keys for the installed measurement applications.

NOTE You may want to keep a copy of your license key in a secure location. You can print out a copy of the display showing the license numbers to do this. If you should lose your license key, call your nearest Agilent 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. Follow the instructions that accompany the certificate to obtain your license key.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you would put the license file on 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 license management application in the instrument. It is found through the instrument front panel keys at **System**, **Licensing. . .** , or internally at C:\Programming Files\Agilent\Licensing.

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

Missing and Old 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 assures that you get any improvements and expanded functionality that is available.

Because the software was loaded at the initial purchase, there may be additional measurement applications that are now available. If the application you are interested in licensing is not available, you will need to do a software update. (Press **System**, **Show**, **System**.)

Check the Agilent internet website for the latest software versions available for downloading:

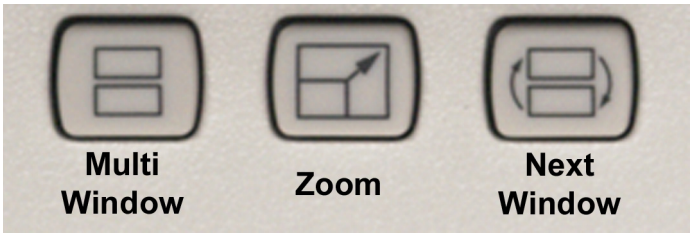
http://www.agilent.com/find/mxa_software
http://www.agilent.com/find/exa_software

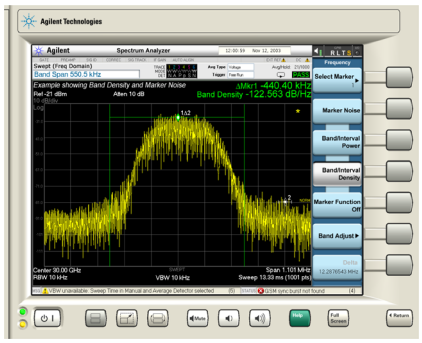
You must load the updated software package into the analyzer from a USB drive, or directly from the internet. An automatic loading program is included with the files.

2 Utility Functions

Window Control Keys

The instrument provides three front-panel keys for controlling windows. They are **Multi Window**, **Zoom**, and **Next Window**. These are all "immediate action" keys.





Multi-Window

The **Multi Window** front-panel key is not used at this time. It is there to support future functionality.

Key Path	**Front-panel key**

Zoom

Zoom is a toggle function. Pressing once Zooms the selected window; pressing again un-zooms.

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.

The state of zoom, and which window is zoomed, is saved in State.

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:TILE|ZOOM`
Example	:DISP:WIND:FORM:ZOOM sets zoomed
	:DISP:WIND:FORM:TILE sets un-zoomed

Preset	TILE

Next Window

This key selects the next window of the current view. When this key is selected in Help Mode, it toggles focus between the table of contents window and the topic pane window.

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>

Selected Window

One and only one window is always selected. The selected window has the focus; as far as the user is concerned, all key presses are going to that window.

If a window is not selected, its boundary is gray. The selected window has a green boundary.

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.

Navigating Windows

When the Next Window key is pressed, the next window in the order of precedence (see below) becomes selected. If the selected window was zoomed, the next window will also be zoomed.

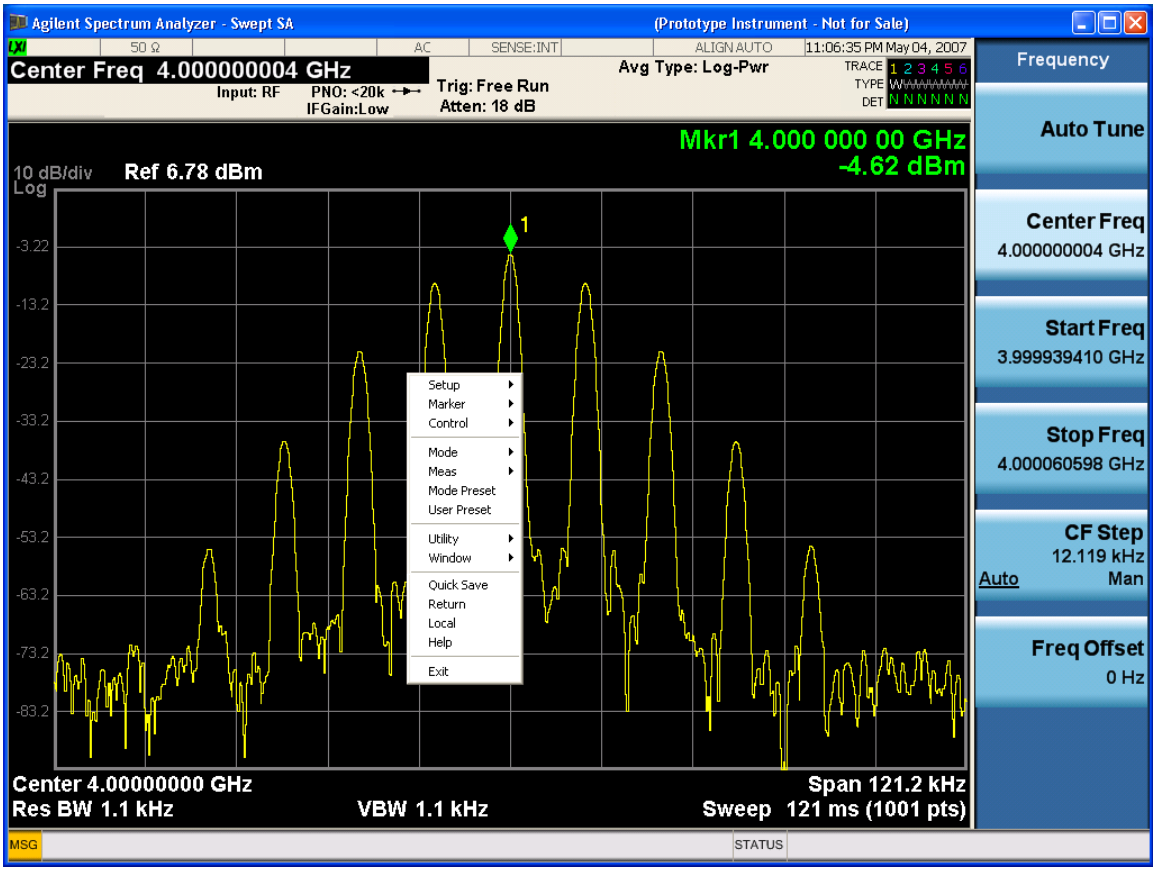
The window navigation does NOT use the arrow and select keys. Those are reserved for navigation within a window.

Mouse and Keyboard Control

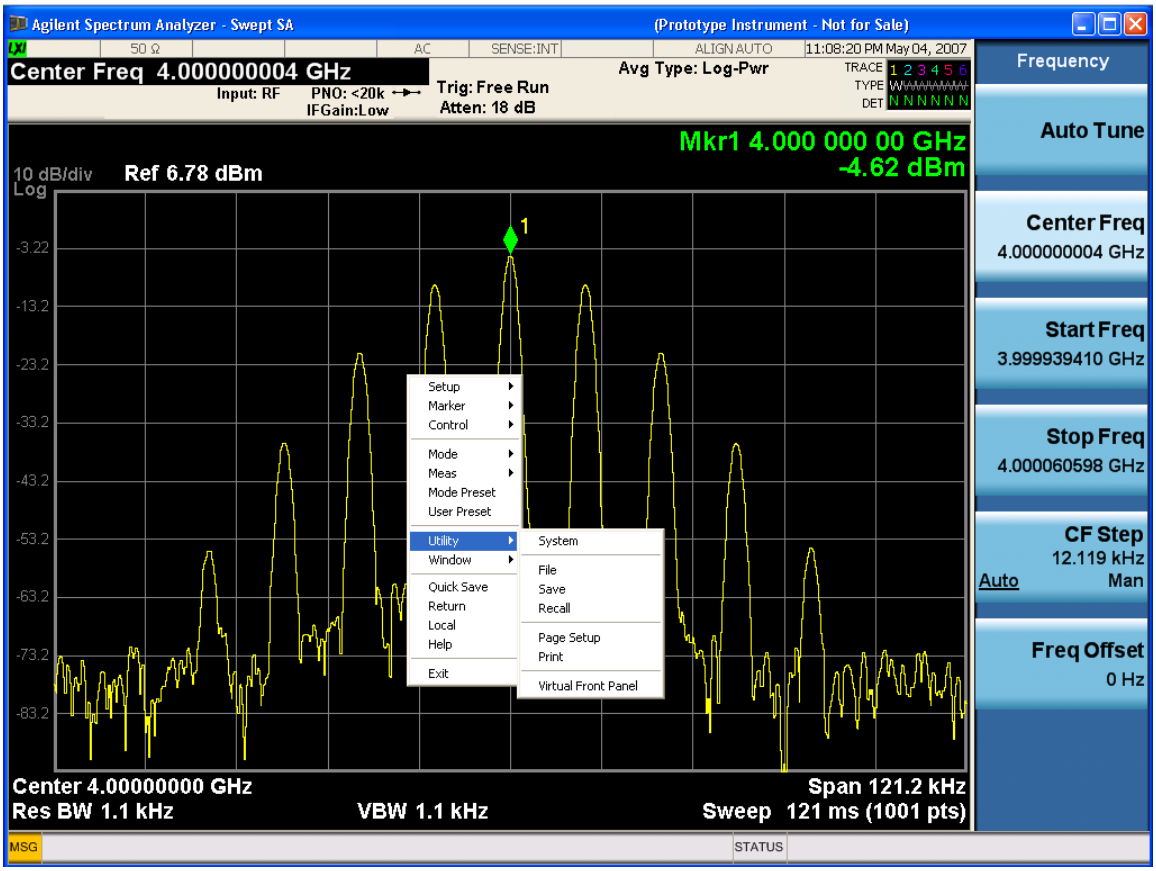
If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front panel keys.

Right-Click

If the user plugs in a mouse and right-clicks on the analyzer screen, a menu will appear as below:

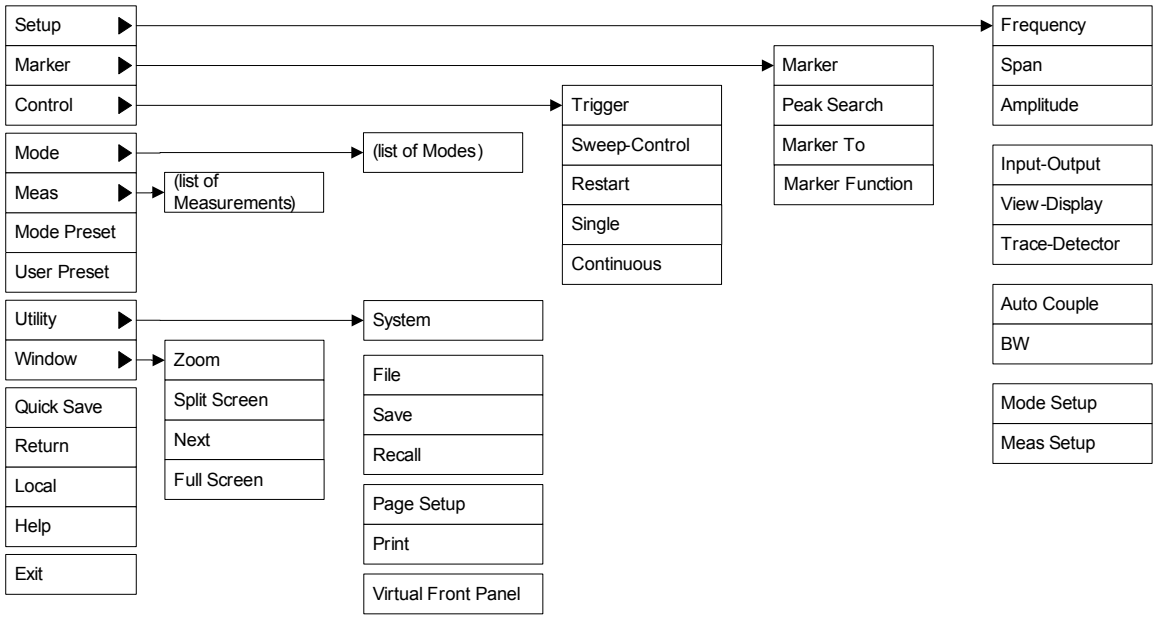


Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



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

The array of keys thus available is shown below:



PC Keyboard

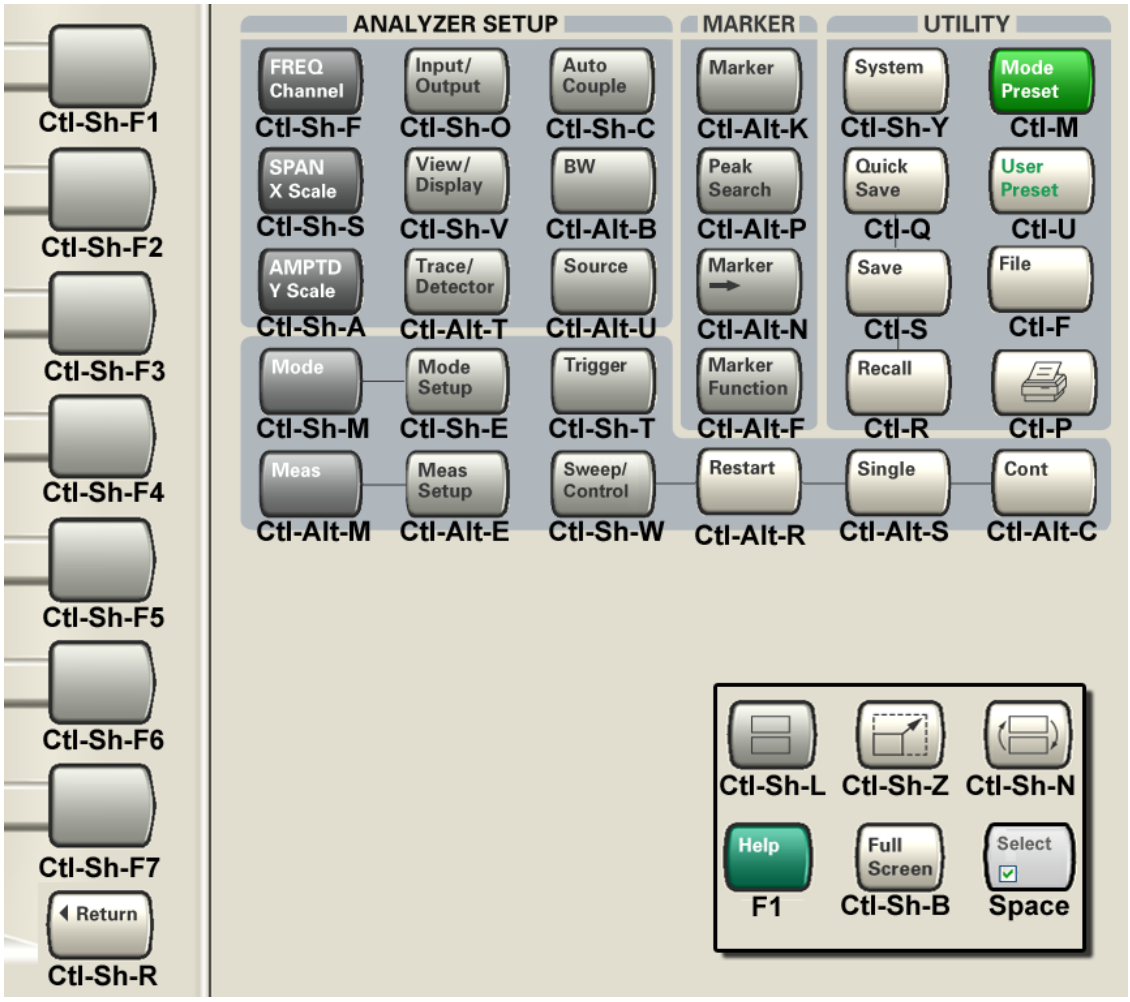
If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

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+SHIFT+E
Marker	CTRL+SHIFT+K
Peak Search	CTRL+SHIFT+P
Marker To	CTRL+ALT+N
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
QuickSave	CTRL+SHIFT+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+F
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+ALT+E
Meas Setup	CTRL+ALT+U
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
NextWindow	CTRL+SHIFT+N
SplitScreen	CTRL+SHIFT+L
FullScreen	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 key1	CTRL+SHIFT+F1
Menu key2	CTRL+SHIFT+F2
Menu key3	CTRL+SHIFT+F3
Menu key4	CTRL+SHIFT+F4
Menu key5	CTRL+SHIFT+F5
Menu key6	CTRL+SHIFT+F6
Menu key7	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

Here is a pictorial view of the table above:



System

Opens a menu of keys that access various configuration menus and dialogs.

Remote Command Notes	No remote command for this key specifically.
Key Path	**Front-panel key**

Show

Opens a menu of choices that enable you to select the information window you want to view.

Mode	All
Remote Command	`:SYSTem:SHOW OFF| ERRor | SYSTem | HARDware | LXI | HWSTatistics | ALIGNment | SOFTware` `:SYSTem:SHOW?`
Example	:SYST:SHOW SYST
Remote Command 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
Key Path	**System**

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 button 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 time is displayed to the second.

The fields on the Errors display are:

Type (unlabelled) - 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. In other words, 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.

Mode	All
Remote Command	`:SYSTem:ERRor[:NEXT]?`
Example	:SYST:ERR?
Restriction and Notes	The return string has the format: "<Error Number>,<Error>" Where <Error Number> and <Error> are defined in the Master Error Messages document.
State Saved	No
Key Path	**System, Show**

Next Page

Next Page and Previous Page menu keys move the user 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, Show Errors**

Previous Page See Next Page.

History

The History and Status keys select the Errors view. The Status key has a second line which shows a number in [square brackets]. This is the number of currently open status items.

Key Path	**System, Show, Show Errors**

Status See History.

Verbose SCPI On/Off

This is a capability that will allow the SCPI data stream to be displayed when a SCPI error is detected, showing the characters which stimulated the error and several of the characters preceding the error.

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
Key Path	**System, Show, Show Errors**

Refresh

When pressed, refreshes the Show Errors display.

Key Path	**System, Show, Show Errors**

Clear Error Queue

This clears all errors in all error queues.

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, Show Errors**

System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

```
<Product Name> <Product Description>
Product Number: N9020A
Serial Number: US46220924
Firmware Revision: A.01.01
Computer Name: <hostname>
Host ID: N9020A,US44220924

N9020A-503      Frequency Range to 3.6 GHz
N9020A-PFR      Precison Frequency Reference
N9020A-P03      Preamp 3.6 GHz

N9060A-2FP      Spectrum Analysis Measurement Suite  1.0.0.0
N9073A-1FP      WCDMA                                1.0.0.0
N9073A-2FP      WCDMA with HSDPA                     1.0.0.0
```

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Mode	All
Example	SYST:SHOW SYST
Key Path	**System, Show**

Hardware

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

Hardware Information
MXA Signal Analyzer
Product Number: N9020A
Serial Number: US46220107
Firmware Revision: A.01.14

Assembly Name	Part #	Serial #	Matl Rev	Rev	OF Rev	Hw Id	Misc
Analog IF	E441060104	78060200131	003	0	C	15	
YIG Tuned Filter	50877305	11061500550	005	0	A	11	
Digital IF	E441060105	78060100559	003	0	F	14	
Front End Controller	E441060101	78060100147	004	2	A	8	
Low Band Switch	E441060170	78060800346	005	1	A	10	
LO Synthesizer	E441060102	78060100226	003	3	G	2	
Reference	E441060108	78060300420	004	1	C	16	
Front End	E441060154	13062800820	010	2	B	9	

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.

Mode	All
Example	SYST:SHOW HARD
Key Path	**System, Show**

LXI

This key shows you the product number, serial number, firmware revision, computer name, IP address, Host ID, LXI Class, LXI Version, MAC Address, and the Auto-MDIX Capability.

Key Path	**System, Show**

LAN Reset

This key resets the LAN connection.

Key Path	**System, Show, LXI**

Power On

The Power On menu key enables you to select how the instrument should power on. The options are: Mode and Input/Output Defaults, User Preset and Last State.

Mode	All
Remote Command	`:SYSTem:PON:TYPE MODE|USER|LAST|PRESet`
	`:SYSTem:PON:TYPE?`
Example	`:SYST:PON:TYPE MODE`
Preset	This is unaffected by Preset but is set to Mode on a “Restore System Defaults->All”
State Saved	No
Key Path	**System**

Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it will perform a Restore Mode Defaults to all modes in the instrument and a Restore Input/Output Defaults as well.

Mode	All
Example	SYST:PON:TYPE MODE
Key Path	**System, Power On**

User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects. NOTE: An instrument could never power up for the first time in User Preset.

Mode	All
Example	SYST:PON:TYPE USER

Key Path	**System, Power On**

Last State

Sets **Power On** to **Last**. When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power **Standby** key or by using the remote command `SYSTem:PDOWn`. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

NOTE: An instrument could never power up for the first time in Last.

NOTE: 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 will not work properly. For more information see Power Standby (Instrument Shutdown).

Mode	All
Example	SYST:PON:TYPE LAST
Restriction and Notes	Power on Last State only works if the user has 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.
Key Path	**System, Power On**

Power On Mode

`This menu key brings up a Mode Menu that lists the available modes and lets you select which Mode to be the power-on mode. This Mode Menu is a 1-of-N list of available modes; not the Mode Menu under the Mode front-panel key. They will look the same, but have very different behavior.`

`This Mode will be used for Power On Mode and Input/Output Defaults and Restore System Defaults All.`

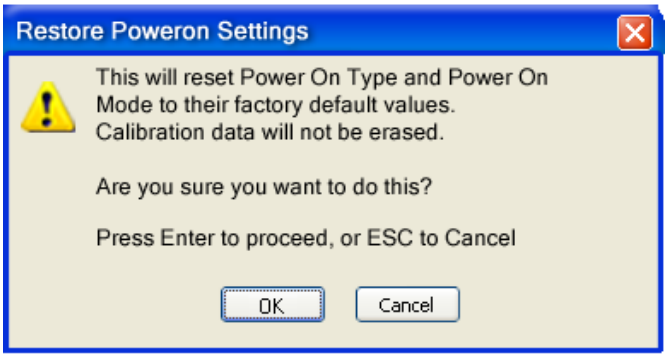
Mode	All

Remote Command	`:SYSTem:PON:MODE SA|PNOISE|EDGEGSM|BASIC|WIMAXOFDMA|PNOISE|WCDMA|VSA89601`
	
	`:SYSTem:PON:MODE?`

Example	SYST:PON:MODE SA
Restriction and 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 Preset but is set on a "Restore System Defaults->All" to SA unless Spectrum Analysis mode is not installed in the instrument in which case the factory will load the default power-on mode.
State Saved	No
Key Path	**System, Power On**

Restore Power On Defaults

This selection causes the Power On Type and Power On Mode 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 menu 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.

Example	:SYST:DEF PON
Key Path	**System, Power On**

Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

Key Path	**System**

Auto Align

Configures the method for which the automatic background alignment is run.

Automatic background alignments are run periodically between measurement acquisitions. The instrument's software determines when alignments are to be performed to maintain warranted operation. The recommended setting for **Auto Align** is **Normal**.

An Auto Align execution cannot be aborted with the Cancel (ESC) key. To interrupt an Auto Align execution, select **Auto Align Off**.

Mode	All
Remote Command	`:CALibration:AUTO ON|PARTial|OFF|ALERt`
	`:CALibration:AUTO?`
Example	:CAL:AUTO ON
Restriction and Notes	While Auto Align is executing, bit 0 of Status Operation register is set.
Dependencies/Couplings	Auto Align is set to Off if Restore Align Data is invoked.
Preset	This is unaffected by Preset but is set to ON upon a "Restore System Defaults->Align".
State Saved	No
Key Path	**System, Alignments**
SCPI Status Bits/OPC Dependencies	When Auto Align is executing Bit 0 in the Status Operational register is set.

Normal

Auto Align, Normal turns on the automatic alignment of all measurement systems. **Auto Align**, **Normal** maintains the instrument in warranted operation across varying temperature and over time.

If the condition "Align Now, All required" is set, transition to **Auto Align**, **Normal** will perform the required alignments and clear the "Align Now, All required" condition and then continue with further alignments as required to maintain the instrument adequately aligned for warranted operation.

When **Auto Align**, **Normal** is selected the Auto Align Off time is set to zero.

When **Auto Align**, **Normal** is selected the Settings Panel indicates ALIGN AUTO:

Mode	All
Example	:CAL:AUTO ON
Restriction and Notes	Alignment processing as a result of the transition to Normal will be executed sequentially. Thus, *OPC? or *WAI following CAL:AUTO ON will return when the alignment processing is complete. The presence of an external signal may interfere with the RF portion of the alignment. If so, the Error Condition "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is reported, and bit 11 is set in the Status Questionable Calibration register. A subsequent alignment of the RF will clear the condition, and clear bit 11 in the Status Questionable Calibration register.
Key Path	**System, Alignments, Auto Align**
SCPI Status Bits/OPC Dependencies	An interfering user signal may prevent automatic alignment of the RF subsystem. If this occurs, the Error Condition "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is reported, the Status Questionable Calibration bit 11 is set, and the alignment proceeds. When a subsequent alignment of the RF subsystem succeeds, either by the next cycle of automatic alignment or from an **Align Now**, **RF**, the Error Condition and Status Questionable Calibration bit 11 are cleared.

Partial

Auto Align, **Partial** disables the full automatic alignment and the maintenance of warranted operation for the benefit of improved measurement throughput. Accuracy is retained for the Resolution Bandwidth filters and the IF Passband which is critical to FFT accuracy, demodulation and many personalities. With Auto Align set to **Partial**, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The **Auto Align**, **Alert** mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the **Align All**, **Now** operation. Another is to return the **Auto Align** selection to **Normal**.

Auto Align, **Partial** is recommended for measurements where the throughput is so important that a few percent improvement is more valued than an increase in the accuracy errors of a few tenths of a decibel. One good application of **Auto Align**, **Partial** would be an automated environment where the alignments can be called during overhead time when the device-under-test is exchanged.

When **Auto Align**, **Partial** is selected the elapsed time counter begins for Auto Align Off time.

When **Auto Align**, **Partial** is selected the Settings Panel indicates ALIGN PARTIAL with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument:

Mode	All
Example	:CAL:AUTO PART
Restriction and Notes	Auto Align Partial begins the elapsed time counter for Auto Align Off time.
Key Path	**System, Alignments, Auto Align**

Off

Auto Align, **Off** disables automatic alignment and the maintenance of warranted operation, for the benefit of maximum measurement throughput. With Auto Align set to **Off**, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The **Auto Align**, **Alert** mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the **Align All**, **Now** operation. Another is to return the **Auto Align** selection to **Normal**.

The **Auto Align**, **Off** setting is rarely the best choice, because **Partial** gives almost the same improvement in throughput while maintaining the warranted performance for a much longer time. The **Off** choice is intended for unusual circumstances such as the measurement of radar pulses where you might like the revisit time to be as consistentent as possible.

When **Auto Align**, **Off** is selected the Auto Align Off time is initialized and the elapsed time counter begins.

When **Auto Align**, **Off** is selected the Settings Panel indicates ALIGN OFF with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument:

Mode	All
Example	:CAL:AUTO OFF
Restriction and Notes	Auto Align Off begins the elapsed time counter for Auto Align Off time.
Dependencies/Couplings	Auto Align is set to Off if Restore Align Data is invoked.
Key Path	**System, Alignments, Auto Align**

All but RF

Auto Align, **All but RF**, configures automatic alignment to include or exclude the RF subsystem. (Eliminating the automatic alignment of the RF subsystem prevents the input impedance from changing. The normal input impendance of 50 ohms can change to an open circuit when alignments are being used. Some devices under test do not behave acceptably under such circumstances, for example by showing instability.) When **Auto Align**, **All but RF ON** is selected, the operator is responsible for performing an **Align Now**, **RF** when RF-related alignments expire. The **Auto Align**, **Alert** mechanism will notify the operator to perform an **Align Now**, **All** when the combination of time and temperature variation is exceeded.

When **Auto Align**, **All but RF ON** is selected the Settings Panel indicates ALIGN AUTO/NO RF with a warning icon (warning icon is intended to inform the operator they are responsible for the maintaining the RF alignment of the instrument):

Mode	All
Remote Command	`:CALibration:AUTO:MODE ALL|NRF`
	`:CALibration:AUTO:MODE?`
Example	:CAL:AUTO:MODE NRF
Preset	This is unaffected by Preset but is set to ALL on a “Restore System Defaults->Align”.
State Saved	No
Key Path	**System, Alignments, Auto Align**

Alert

The instrument will signal an Alert when conditions exist such that you will need to perform a full alignment (for example, **Align Now**, **All**). The Alert can be configured in one of four settings; **Time & Temperature**, **24 hours**, **7 days**, or **None**. A confirmation is required when a selection other than **Time & Temperature** is chosen. This prevents accidental deactivation of alerts.

With **Auto Align** set to **Normal**, the configuration of **Alert** is not relevant because the instrument’s software maintains the instrument in warranted operation.

Mode	All
Remote Command	`:CALibration:AUTO:ALERt TTEMperature|DAY|WEEK|NONE`
	`:CALibration:AUTO:ALERt?`
Example	:CAL:AUTO:ALER TTEM

Remote Command Notes	The alert that alignment is needed is the setting of bit 14 in the Status Questionable Calibration register.
Preset	This is unaffected by Preset but is set to TTEMperature on a “Restore System Defaults->Align”.
State Saved	No
Key Path	**System, Alignments, Auto Align**
SCPI Status Bits/OPC Dependencies	The alert is the Error Condition “Align Now, All required” and bit 14 is set in the Status Questionable Calibration register.

Time & Temperature

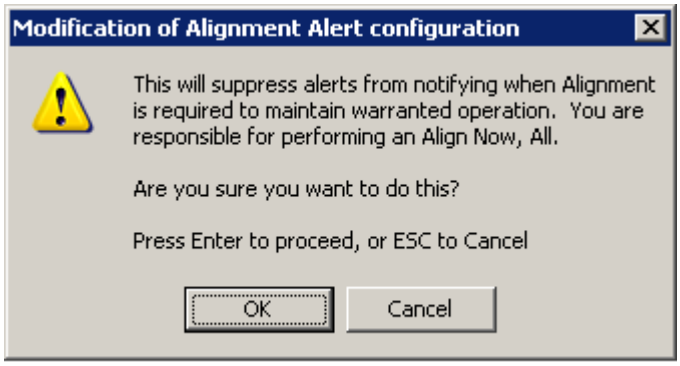
With Auto Align Alert set to **Time & Temperature** the instrument will signal an alert when alignments expire due to the combination of the passage of time and changes in temperature. The alert is the Error Condition “Align Now, All required”. If this choice for Alert is selected, the absence of an alert means that the analyzer alignment is sufficiently up-to-date to maintain warranted accuracy.

Mode	All
Example	:CAL:AUTO:ALER TTEM
Key Path	**System, Alignments, Auto Align, Alert**
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.

24 hours

With Auto Align Alert set to **24 Hours** the instrument will signal an alert after a time span of 24 hours since the last successful full alignment (for example, **Align Now**, **All** or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a daily basis at a small risk of accuracy errors in excess of the warranted specifications. The alert is the Error Condition “Align Now, All required”.

For front panel operation, confirmation is required to transition into this setting of Alert. The confirmation dialog is:



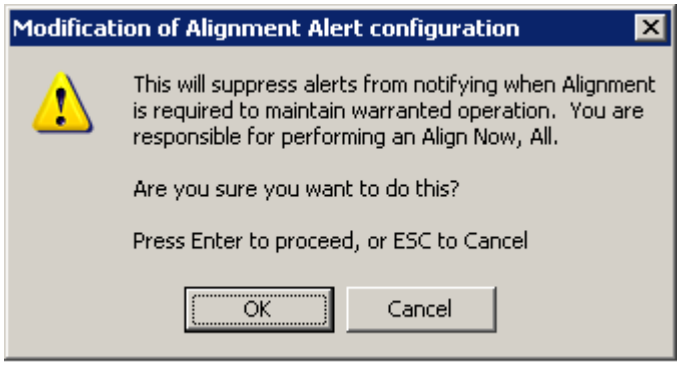
No confirmation is required when Alert is configured through a remote command.

Mode	All
Example	:CAL:AUTO:ALER DAY
Key Path	**System, Alignments, Auto Align, Alert**
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.

7 days

With Auto Align Alert is set to **7 days** the instrument will signal an alert after a time span of 168 hours since the last successful full alignment (for example, **Align Now**, **All** or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a weekly basis, at a modest risk of accuracy degradations in excess of warranted performance. The alert is the Error Condition “Align Now, All required”.

For front panel operation, confirmation is required for the customer to transition into this setting of Alert. The confirmation dialog is:



No confirmation is required when Alert is configured through a remote command.

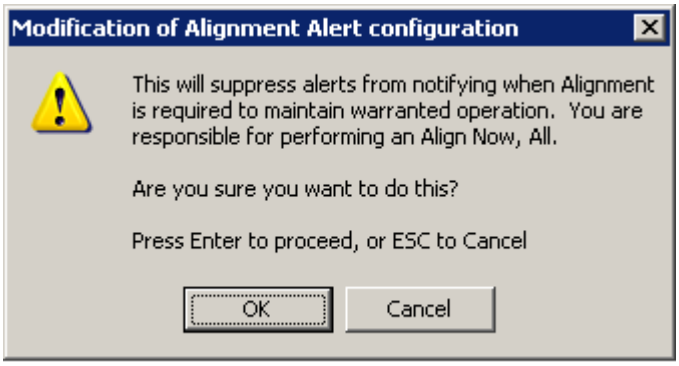
Mode	All

Example	:CAL:AUTO:ALER WEEK
Key Path	**System, Alignments, Auto Align, Alert**
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.

None

With Auto Align Alert set to **None** the instrument will not signal an alert. This is provided for rare occasions where you are making a long measurement which cannot tolerate Auto Align interruptions, and must have the ability to capture a screen image at the end of the measurement without an alert posted to the display. Agilent does not recommends using this selection in any other circumstances, because of the risk of accuracy performance drifting well beyond expected levels without the operator being informed.

For front panel operation, confirmation is required to transition into this setting of Alert. The confirmation dialog is:



No confirmation is required when Alert is configured through a remote command.

Mode	All
Example	:CAL:AUTO:ALER NONE
Key Path	**System, Alignments, Auto Align, Alert**

Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Key Path	**System, Alignments**

All

Immediately executes an alignment of all subsystems. 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 “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is set. In addition the Error Condition “Align Now, RF required” is set, 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 “Align Now, All required” is set, 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.

Mode	All
Remote Command	`:CALibration[:ALL]`
	`:CALibration[:ALL]?`
Example	:CAL
Restriction and Notes	An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.

Dependencies/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.
Remote Command 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.
Key Path	**System, Alignments, Align Now**
SCPI Status Bits/OPC Dependencies	Bits 11, 12 or 14 may be set in the Status Questionable Calibration register.

Mode	All
Remote Command	`*CAL?`
Example	*CAL?
Restriction and Notes	Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Remote Command 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]?

All but RF

Immediately executes an alignment of all subsystems except the RF subsystem. The instrument will stop any measurement currently underway, perform the alignment, 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 "Align Now, RF required" is asserted 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 "Align Now, All required" is set, 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.

Mode	All
Remote Command	`:CALibration:NRF`
	`:CALibration:NRF?`
Example	:CAL:NRF
Dependencies/Couplings	Initializes the time for the Last Align Now, All Time.
	Records the temperature for the Last Align Now, All Temperature.

Remote Command 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".
Key Path	**System, Alignments, Align Now**
SCPI Status Bits/OPC Dependencies	Bits 12 or 14 may be set in the Status Questionable Calibration register.

RF

Immediately executes an alignment of the RF subsystem. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

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 raise the Error Condition "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.

A failure encountered during alignment will set the Error Condition "Align RF failed" and set bit 3 in the Status Questionable Calibration register.

Successful completion of **Align Now**, **RF** 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. It will also 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 "Align Now, RF required" is set, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

Mode	All
Remote Command	`:CALibration:RF`
	`:CALibration:RF?`
Example	:CAL:RF
Restriction and Notes	An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Dependencies/Couplings	Initializes the time for the Last Align Now, RF Time.
	Records the temperature for the Last Align Now, RF Temperature.
Remote Command 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 will clear bits 3, 11, and 12 in the Status Questionable Calibration register.
	A failure encountered during alignment will set the Error Condition “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.
Key Path	**System, Alignments, Align Now**
SCPI Status Bits/OPC Dependencies	Bits 11, 12 or 14 may be set in the Status Questionable Calibration register.

Advanced

Advanced accesses alignment processes that are immediate action operations that perform operations that run until complete. Advanced alignments are performed on an irregular basis, or require additional operator interaction

Key Path	**System, Alignments**

Characterize Preselector (Only with Option 507, 508, 513, or 526)

The Preselector tuning curve drifts over temperature and time. Recognize that the **Amplitude**, **Presel Center** function adjusts the preselector for accurate amplitude measurements at an individual frequency. **Characterize Preselector** improves the amplitude accuracy by ensuring the Preselector is approximately centered at all frequencies without the use of the **Amplitude**, **Presel Center** function. **Characterize Preselector** can be useful in situations where absolute amplitude accuracy is not of utmost importance, and the throughput savings or convenience of not performing a **Presel Center** is desired. **Presel Center** is required prior to any measurement for best (and warranted) amplitude accuracy.

Agilent recommends that the **Characterize Preselector** operation be performed yearly as part of any calibration, but performing this operation every three months can be worthwhile.

Characterize Preselector immediately executes a characterization of the Preselector, which is a YIG-tuned filter (YTF). The instrument stops any measurement currently underway, performs the characterization, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

The query form of the remote commands (:CALibration:YTF?) will invoke the alignment of the YTF subsystem and return a success or failure value.

A failure encountered during alignment will set the Error Condition “Characterize YTF failed” and set bit 9 in the Status Questionable Calibration register.

Successful completion of **Advanced**, **Characterize Preselector** will clear the Error Condition “Characterize YTF failed”, and clear bit 9 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Characterize Preselector Time, and capture the Last Characterize Preselector Temperature.

The last Characterize Preselector Time and Temperature must survive across the power cycle as this operation is performed infrequently.

Advanced, **Characterize Preselector** can be interrupted by pressing the Cancel (ESC) front panel key or remotely with Device Clear followed by the :ABORt SCPI command. None of the new characterization data is then used.

Mode	All
Remote Command	`:CALibration:YTF`
	`:CALibration:YTF?`
Example	:CAL:YTF
Restriction and Notes	For Option 507, 508, 513, and 526 only.
Dependencies/Couplings	Initializes the time for the Last Characterize Preselector Time.
	Records the temperature for the Last Characterize Preselector Temperature.

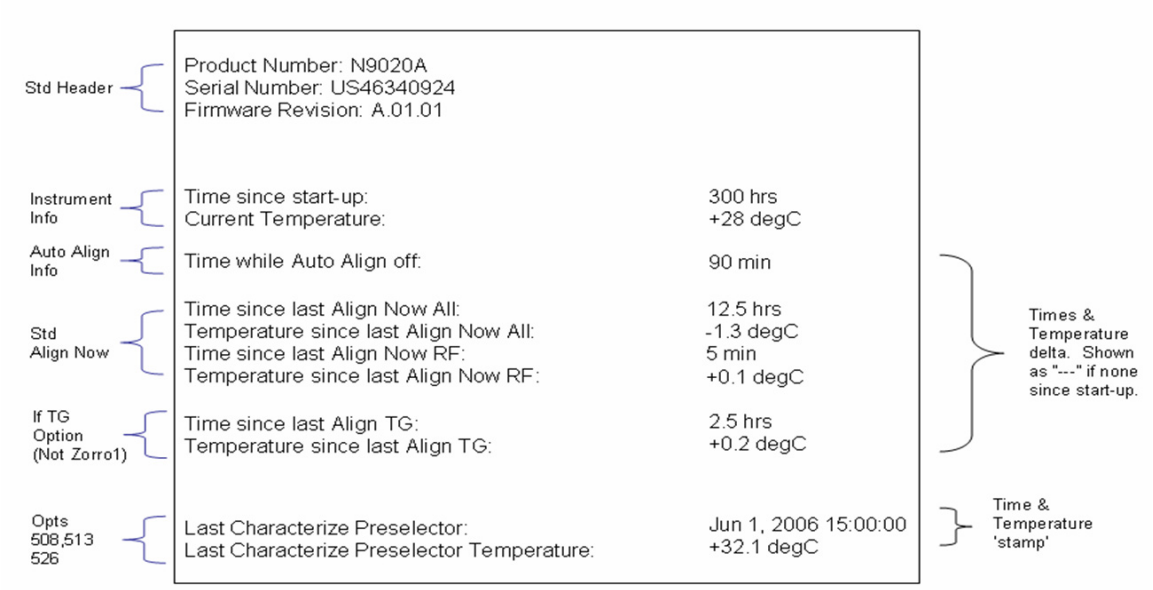
Remote Command Notes	:CALibration:YTF? returns 0 if successful :CALibration:YTF? returns 1 if failed (including interfering user signal) While Advanced, Characterize Preselector is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in 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 9 in the Status Questionable Calibration register. A failure encountered during alignment will set the Error Condition “Characterize Preselector failed” and set bit 9 in the Status Questionable Calibration register.
Key Path	**System, Alignments, Align Now**

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 which 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.

Mode	All
Example	SYST:SHOW ALIGN
Restriction and Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:SYSTem:PON:TIME?`
Example	:SYST:PON:TIME?
Restriction and Notes	Value is the time since the present application start-upon in seconds.
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TEMPerature:CURRent?`
Example	:CAL:TEMP:CURR?
Restriction and Notes	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TIME:LALL?`
Example	:CAL:TIME:LALL?
Restriction and 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
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TEMPerature:LALL?`
Example	:CAL:TEMP:LALL?
Restriction and 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
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TIME:LRF?`
Example	:CAL:TIME:LRF?

Restriction and 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
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TEMPerature:LRF?`
Example	:CAL:TEMP:LRF?
Restriction and 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
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TIME:LPReselector?`
Example	:CAL:TIME:LPR?
Restriction and Notes	Value is date and time the last successful Characterize Preselector was executed. The date is separated from the time by a space character. Returns “” if no Characterize Preselector has ever been performed on the instrument.
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:TEMPerature:LPReselector?`
Example	:CAL:TEMP:LPR?
Restriction and Notes	Value is in degrees Centigrade at which the last successful Characterize Preselector was executed.
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Mode	All
Remote Command	`:CALibration:AUTO:TIME:OFF?`
Example	:CAL:AUTO:TIME:OFF?
Restriction and Notes	Value is the elapsed time, in seconds, since Auto Align has been set to Off or Off with Alert. The value is 0 if Auto Align is ALL or NORF.
State Saved	No
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Timebase DAC

Allows control of the internal 10 MHz reference oscillator timebase. This may be used to adjust for minor frequency alignment between the signal and the internal frequency reference. This adjustment has no effect if the instrument is operating with an External Frequency Reference.

If the value of the Timebase DAC changes (by switching to Calibrated from User with User set to a different value, or in User with a new value entered) an alignment may be necessary. The alignment system will take appropriate action; which will either invoke an alignment or cause an Alert.

Mode	All
Remote Command	`:CALibration:FREQuency:REFerence:MODE CALibrated|USER` `:CALibration:FREQuency:REFerence:MODE?`
Example	:CAL:FREQ:REF:MODE CAL
Restriction and Notes	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Remote Command Notes	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Preset	This is unaffected by Preset but is set to CALibrated on a “Restore System Defaults->Align”.
State Saved	No
Key Path	**System, Alignments**

Calibrated

Sets the Timebase DAC to the value established during factory or field calibration. The value displayed on the menu key is the calibrated value.

Mode	All
Example	:CAL:FREQ:REF:MODE CAL
Key Path	**System, Alignments, Timebase DAC**

User

Allows setting the Timebase DAC to a value other than the value established during the factory or field calibration. The value displayed on the menu key is the calibrated value.

Mode	All
Example	:CAL:FREQ:REF:MODE USER
Key Path	**System, Alignments, Timebase DAC**

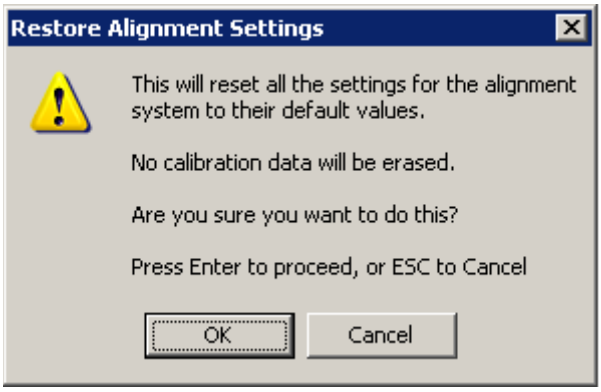
Mode	All
Remote Command	`:CALibration:FREQuency:REFerence:FINE <integer>`
	`:CALibration:FREQuency:REFerence:FINE?`
Example	:CAL:FREQ:REF:FINE 8191
Restriction and Notes	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Dependencies/Couplings	Setting :CAL:FREQ:REF:FINE sets :CAL:FREQ:REF:MODE USER
Preset	This is unaffected by Preset but is set to the factory setting on a “Restore System Defaults->Align”.
State Saved	No
Min	0
Max	16383
Key Path	**System, Alignments, Timebase DAC**

Remote Command	`:CALibration:FREQuency:REFerence:COARse <integer>` `:CALibration:FREQuency:REFerence:COARse?`
Example	:CAL:FREQ:REF:COAR 8191
Dependencies/Couplings	Setting :CAL:FREQ:REF:COAR sets :CAL:FREQ:REF:MODE USER
Remote Command Notes	This is an alias for CAL:FREQ:REF:FINE any change to COARse is reflected in FINE and vice-versa. See CAL:FREQ:REF:FINE for description of functionality.

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:

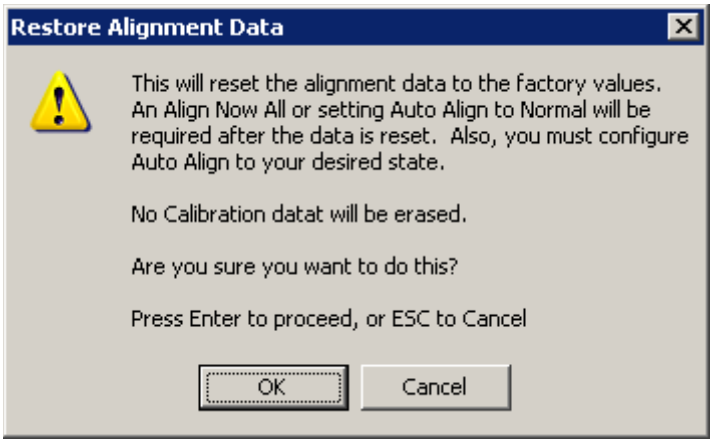
Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off
Auto Align Alert	Time & Temperature

Mode	All
Example	:SYST:DEF ALIG
Restriction and 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.
Key Path	**System, Alignments**

Restore Align Data

Initializes the alignment data to the factory default values. This action is normally not necessary. It is recommended if alignment errors occur. If alignment errors continue to occur after Restore Align Data, the instrument is in need of repair. Align Now, All must be executed to regain warranted operation, and the user is responsible for configuring Auto Align thereafter.

For front panel operation, confirmation is requiredbefore setting the alignment data to factory defaults. The confirmation dialog is:



The Error Condition “Align Now, All required” is set, and bit 14 in the Status Questionable Calibration register is set. Auto Align is set to Off.

Mode	All
Remote Command	`:CALibration:DATA:DEFault`
Example	:CAL:DATA:DEF
Dependencies/Couplings	Sets Auto Align to Off. Sets bit 14 in the Status Questionable Calibration register. The Error Condition “Align Now, All required” is set.
Key Path	**System, Alignments**

I/O Config

Activates a menu for identifying and changing the I/O configuration for remote control.

Key Path	**System**

GPIB Address

Select the GPIB remote address.

Mode	All
Remote Command	`:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRess <integer>`
	`:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRess?`
Example	:SYST:COMM:GPIB:ADDR 17
Remote Command Notes	NOTE: Changing the Address on the GPIB port requires all further communication to use the new address.
Preset	This is unaffected by Preset but is set to 18 on a “Restore System Defaults->Misc”
State Saved	No
Range	0 to 30
Key Path	**System, I/O Config**

SCPI LAN Menu

Activates a menu for identifying and changing the SCPI over LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

Key Path	**System, I/O Config**

SCPI Telnet

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over

LAN through telnet.

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 on a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Key Path	**System, I/O Config, SCPI LAN**

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.

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 Preset but is set to ON on a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Key Path	**System, I/O Config, SCPI LAN**

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

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

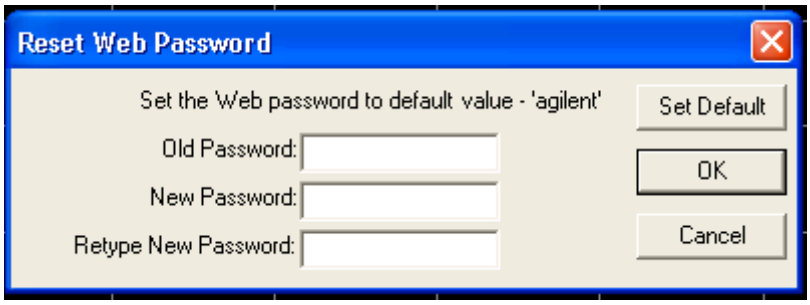
Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF|ON|0|1` `:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?`
Example	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON on a “Restore System Defaults->Misc”
State Saved	No

Range	On | Off
Key Path	**System, I/O Config, SCPI LAN**

Reset Web Password

The embedded webserver contains certain capability which are password protected; modifying the LAN configuration of the instrument, and access to web pages that can change the settings of the instrument. The default password from the factory is 'agilent' (without the quotes). The control provided here is the means to set the web password as the user desires, or to reset the password to the factory default.

Selecting Reset web password brings up a control for resetting the password as the user desires, or to the factory default. An external keyboard is required to change the password from the factory default of 'agilent' or to set a new password that contains alphabetic characters. The control is:



If this control is entered without an external keyboard or mouse connected, you can cancel the control by pressing the Cancel (ESC) hardkey.

Mode	All
Key Path	**System, I/O Config**

Query USB Connection (Remote Command Only)

Enables you to determine the speed of USB connection.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:CONNection?`
Example	:SYST:COMM:USB:CONN?

Remote Command Notes	NONE – Indicates no USB connection has been made. LSPeed – Indicates a USB low speed connection (1.5 Mbps). Note: this is reserved for future use, the T+M488 protocol is not supported on low speed connections. HSPeed – Indicates that a USB high speed connection (480 Mbps) has been negotiated. FSPeed – Indicates that a USB full speed connection (12 Mbps) has been negotiated.
State Saved	No
Range	NONE | LSPeed | HSPeed | FSPeed

USB Connection Status (Remote Command Only)

Enables you to determine the current status of the USB connection.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:STATus?`
Example	:SYST:COMM:USB:STAT?
Remote Command Notes	SUSPended – Indicates that the USB bus is currently in its suspended state. The bus is in the suspended state when: The bus is not connected to any controller The controller is currently powered off The controller has explicitly placed the USB device into the suspended state. When in the suspended state, no USB activity, including start of frame packets are received. ACTive – Indicates that the USB device is in the active state. When the device is in the active state, it is receiving periodic start of frames but it isn't necessarily receiving or transmitting data.
State Saved	No
Range	SUSPended | ACTive

USB Packet Count (Remote Command Only)

Enables you to determine the number of packets received and transmitted on the USB bus.

Mode	All
Remote Command	`:SYSTem:COMMunicate:USB:PACKets?`

Example	:SYST:COMM:USB:PACK?
Remote Command Notes	Two integers are returned. The first is the number of packets received since application invocation, the second is the number of packets transmitted since application invocation. If no packets have been received or transmitted the response is 0,0. The packet count is initialized to 0,0 when the instrument application is started.
State Saved	No

Restore Defaults

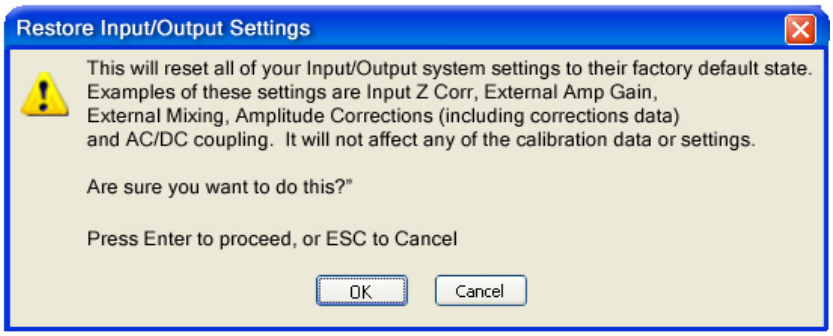
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values. The menu options are: Input/Output Settings, Power On, Alignments, Misc, All Modes, and All.

Mode	All
Remote Command	`:SYSTem:DEFault [ALL] | ALIGn | INPut | MISC | MODes | PON`
Example	SYST:DEF
State Saved	No
Key Path	**System**

Input/Output Settings

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:



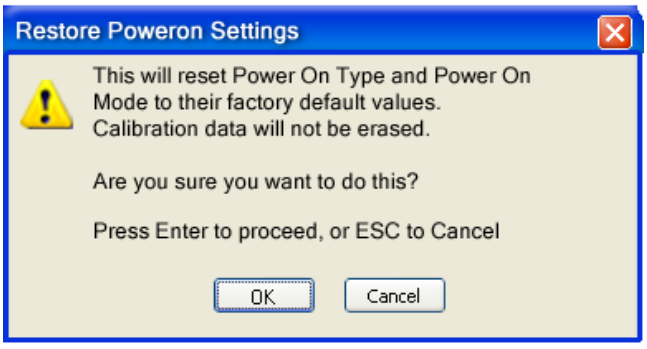
Example :SYST:DEF INP

Key Path **System, Restore System Defaults**

Power On

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 Mode reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



Example :SYST:DEF PON

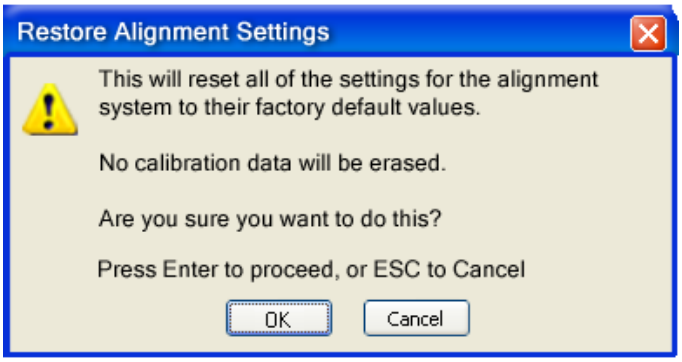
Key Path **System, Restore System Defaults**

Align

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:



Example	:SYST:DEF ALIG
Key Path	**System, Restore System Defaults**

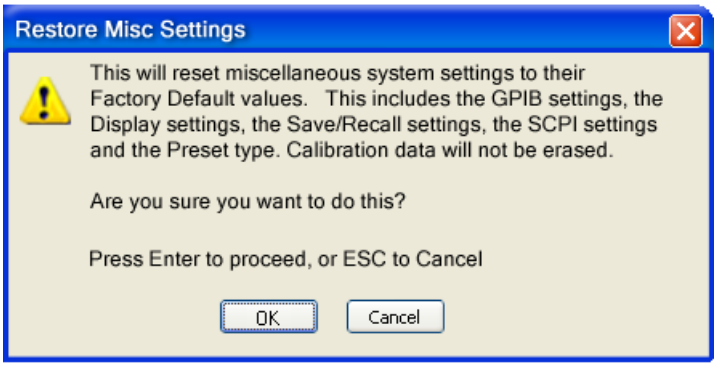
Misc

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
GPIB Address	18
Auto File Name Number	000
Save Type	State
State Save To	Register 1

Screen Save To	SCREEN000.png
DISP:ENABle	ON
Full Screen	Off
SCPI Telnet	ON
SCPI Socket	ON
SILC Server	ON
Display Intensity	100
Display Backlight	ON
Display Theme	TDColor
System Annotation	ON
The SYST:PRES:TYPE	MODE

Confirmation is required to restore the factory default values. The confirmation dialog is:

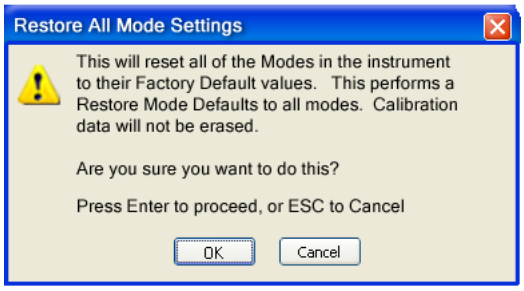


Example	:SYST:DEF MISC
Key Path	**System, Restore System Defaults**

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:



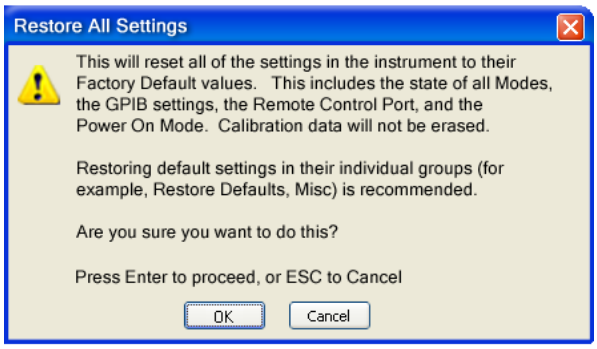
.

Example	:SYST:DEF MOD
Dependencies/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.
Key Path	**System, Restore System Defaults**

All

This is the catastrophic function that does 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:



Example	:SYST:DEF ALL

Dependencies/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.
Key Path	**System, Restore System Defaults**

Control Panel…

Opens the Windows Control Panel.

Pressing any key will cause the Control Panel to exit.

Remote Command Notes	No remote command for this key.
Key Path	**System**

Licensing…

Opens the license explorer.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

Remote Command Notes	No equivalent remote command for this key.
Key Path	**System**

There are five remote commands available for licensing.

Remote Command	`:SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">`
Example	SYST:LKEY “N9073A–1FP”, “B043920A51CA” SYST:LKEY “N9073A–1F1,1.000”, “5D71E9BA814C,13-aug–2005” SYST:LKEY “N9000–001,1.000”, “8BEDC0B6D4AE,05-apr–2005,SN=0”

Remote Command 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 backward compatibility.

Remote Command

```
:SYSTem:LKEY:DELete <"OptionInfo">,<"LicenseInfo">
```

Example

```
SYST:LKEY:DEL "N9073A–1FP", "B043920A51CA"
```

```
SYST:LKEY:DEL "N9073A–1F1,1.000", "5D71E9BA814C, 13-aug–2005"
```

Remote Command 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 backward compatibility.

Remote Command

```
:SYSTem:LKEY:LIST?
```

Remote Command 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

Remote Command `:SYSTem:LKEY? <"OptionInfo">`

Example SYST:LKEY? "N9073A–1FP"

Remote Command 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"

Remote Command `:SYSTem:HID?`

Remote Command Notes Return value is the host ID as a string

Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

Key Path **System, More**

Show Hardware Statistics

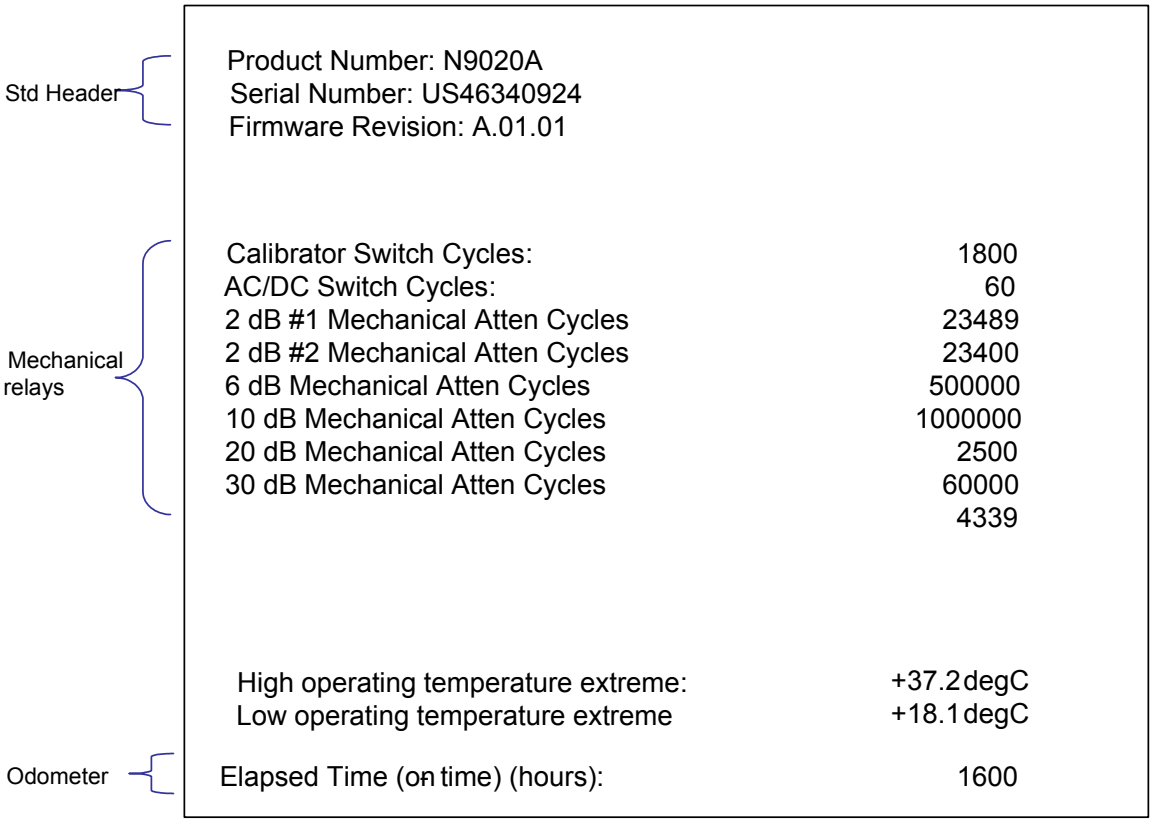
Provides a display of various hardware statistics. The statistics include the following:

Mechanical relay cycles

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 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.

Mode	All
Restriction and Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Key Path	**System, Diagnostics**

Each of the hardware statistic items can be queriedvia SCPI. Query the Mechanical Relay Cycle Count

Returns the count of mechanical relay cycles.

Remote Command	`:SYSTem:MRELay:COUNt?`
Example	:SYST:MREL:COUN?
Restriction and Notes	The return value is a comma separated list of the individual counts for each mechanical relay. The position of the relays in the list is: "<Cal Signal>,<AC/DC>,<2dB #1 Atten>,<2dB #2 Atten>,<6dB Atten>,<10dB Atten>,<20dB Atten>,<30dB Atten>"
Remote Command Notes	Query Only

Query the Operating Temperature Extremes

Returns the low operating temperature extreme value. The value survives a power-cycle and is the temperature extreme encountered since the value was reset by the factory or service center.

Mode	All
Remote Command	`:SYSTem:TEMPerature:LEXTreme?`
Example	:SYST:TEMP:LEXT?
Restriction and Notes	Value is in degrees Celsius at which the lowest operating temperature has been recorded since 1st power-up.
State Saved	No

Returns the high operating temperature extreme value. The value survives a power-cycle and is the temperature extreme encountered since the value was reset by the factory or service center.

Mode	All
Remote Command	`:SYSTem:TEMPerature:HEXTreme?`
Example	:SYST:TEMP:HEXT?
Restriction and Notes	Value is in degrees Celsius at which the highest operating temperature has been recorded since 1st power-up.
State Saved	No

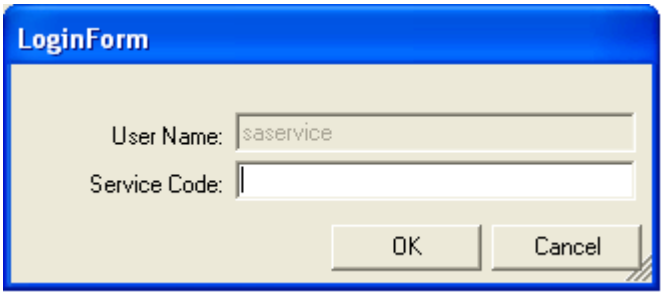
Query the Elapsed Time since 1st power on

Returns the elapsed on-time since 1st power-on (odometer).

Remote Command	`:SYSTem:PON:ETIMe?`
Example	:SYST:PON:ETIM?
Remote Command Notes	Query Only

Advanced

Accesses advanced diagnostic capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “saservice”. The first access to the Advanced Diagnostic Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Advanced Diagnostic Menu are unimpeded. The Authentication dialog looks like:



“OK” is the default key thus the Enter key is used to complete the entry. If invalid Service Code is entered authentication is not granted and the user is provided the following dialog:

Restriction and Notes	**Password is required to access this menu.**
Key Path	**System, Diagnostics**

Service

Accesses capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “advanceduser” or “saservice”. The first access to the Service Menu after invoking the instrument application will require an authentication Service Code.

Key Path	**System**

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?
Restriction and 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

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
Remote Command 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

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?
Remote Command Notes	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)

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?

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”
Remote Command 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

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”
Remote Command Notes	<hour> is the two digit representation of the hour in 24 hour format
	<minute> is the two digit representation of minute
	<day> is the two digit representation of second

Preset

Mode Preset

The Mode preset is the most common way to get the active mode back to a known state. It will keep you in the currently active mode and reset the mode settings to their mode preset state. It will never cause a mode switch. It does a partial preset. It does not affect any mode persistent settings or any system settings.

The **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 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.

Remote Command	`:SYSTem:PRESet`
Example	`:SYST:PRES`
Restriction and Notes	Clears all pending OPC bits. The Status Byte is set to 0.
Dependencies/Couplings	A Mode Preset will cause the currently running measurement to be aborted and cause the default measurement to be active. Mode Preset gets the mode to a consistent state with all of the default couplings set.
Remote Command 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.
Key Path	**Front-panel key**

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front panel access. Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurement 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.

The Auto Couple front panel key is a Meas local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to the other measurements in the mode will not be affected by Auto Couple.

The Meas Preset key is a Meas local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

The Mode Preset (front-panel key on front panel) resets all the current mode's Meas local and Meas global variables except the persistent ones.

The Restore Mode Defaults key 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

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. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by Restore System Defaults. This function does reset mode data; as well as settings.

Remote Command	`:INSTrument:DEFault`
Example	:INST:DEF
Restriction and Notes	A pop-up message comes up saying: “If you are sure, press key again”.
Dependencies/Couplings	A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set.
Remote Command Notes	Clears all pending OPC bits. The Status Byte is set to 0.
Key Path	**Mode Setup**

*RST (Remote Command Only)

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

Remote Command	`*RST`
Example	`*RST`
Restriction and Notes	Clears all pending OPC bits and the Status Byte is set to 0.
Dependencies/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.
Remote Command Notes	Sequential

User Preset

The User Preset key opens up a menu that gives you three choices – execute the **User Preset** by pressing the **User Preset** softkey, User Preset all of the modes in the analyzer by pressing the **User Preset All Modes** softkey, and save the current state for the current mode by pressing the **Save User Preset** softkey.

User Preset

User Preset behaves similarly to **Recall State** in that it recalls a hidden Save State file. However, since each Mode has its own **User Preset** file, **User Preset** will never cause a mode switch, whereas recalling a Save State file may cause a mode switch, if the Save State file was saved while in a different mode.

The User Preset file is a Save State file. **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`. So for any given Mode, the only way to perform a User Preset is from that Mode, not from any other Mode. The user has no control over the user preset filename and has no direct access to the user preset file.

User Preset recalls a mode's state which includes all of the variables affected by doing a Mode Preset. It not only recalls Mode Preset settings, but it also recalls all of the mode persistent settings. User Preset also recalls all of the Input/Output system settings 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, so 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.

User Preset 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.

Remote Command `:SYSTem:PRESet:USER`

Example	:SYST:PRES:USER:SAVE :SYST:PRES:USER
Restriction and Notes	Clears all pending OPC bits. The Status Byte is set to 0.
Dependencies/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.
Remote Command Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Key Path	**User Preset**

User Preset All Modes

User Preset All Modes behaves similarly to Power On User Preset, since it 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.

User Preset 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.

Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE :SYST:PRES:USER:ALL
Restriction and Notes	Clears all pending OPC bits. The Status Byte is set to 0.

Dependencies/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.
Remote Command Notes	`:SYST:PRES:USER:SAVE` is used to save the current state as the user preset state.
Key Path	**User Preset**

Save User Preset

Save User Preset saves the currently active mode and its state. The way the user recalls this User Preset file is 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.

Remote Command	`:SYSTem:PRESet:USER:SAVE`
Example	`:SYST:PRES:USER:SAVE`
Restriction and 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.
Key Path	**User Preset**

File

Opens a menu of keys which access various standard and custom Windows dialogs. Pressing any other front-panel key exits any of these dialogs.

File Explorer

Opens the standard Windows File Explorer. Pressing any front panel key closes the Explorer application.

File Explorer opens up in My Documents..

Page Setup

Refer to your Microsoft Windows Operating System manual.

Print Theme – Remote Command

The graphical user interface contains a selection for choosing the Theme to use when printing. An equivalent remote command is provided. Refer to the View/Display section for more detail on Themes.

Mode	All
Remote Command	`:SYSTem:PRINt:THEMe TDColor | TDMonochrome | FCOLor | FMONochrome`
	`:SYSTem:PRINt:THEMe?`
Example	`:SYST:PRIN:THEM FCOL`
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

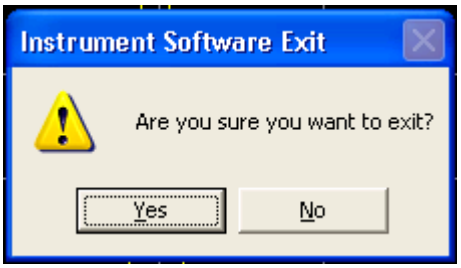
Print

Refer to your Microsoft Windows Operating System manual.

Exit

This key, when pressed, will exit the Instrument Application. A dialog box will be used to

confirm that the user intended to exit the application:



Mode	All
Key Path	**File, Exit**

Print

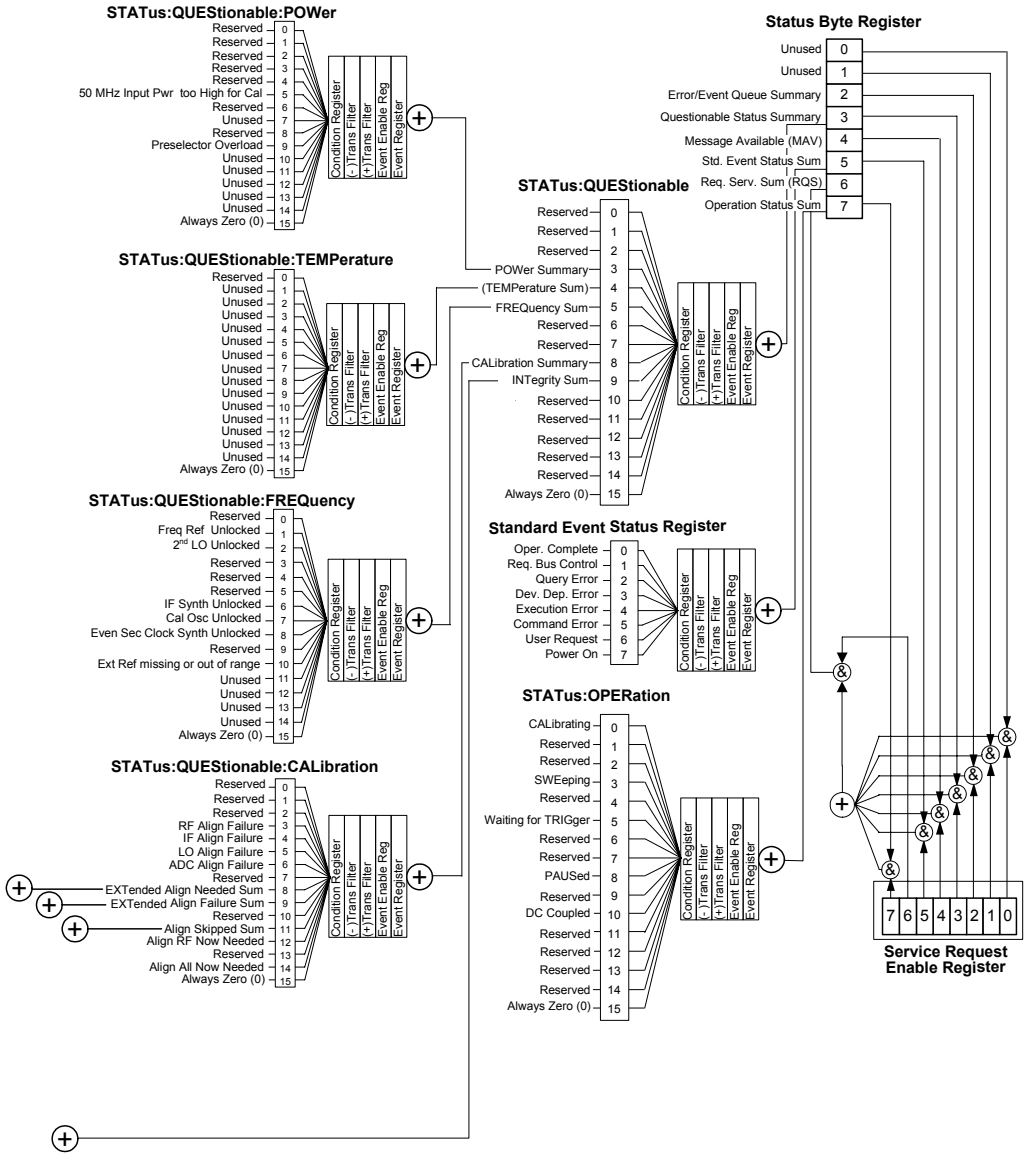
The Print front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the current printer.

Key Path	**Front-panel key**

STATus Subsystem (No equivalent front panel keys)

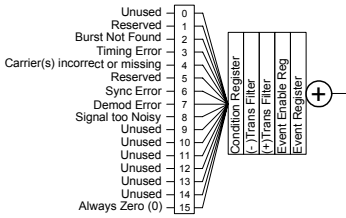
The following graphics show the current MXA Status Register Subsystem implementation.

MXA Status Byte Register System

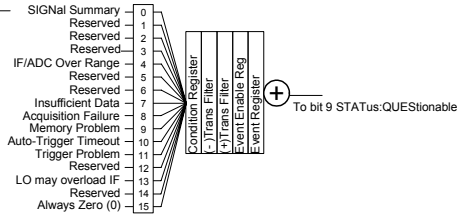


Additional Registers:

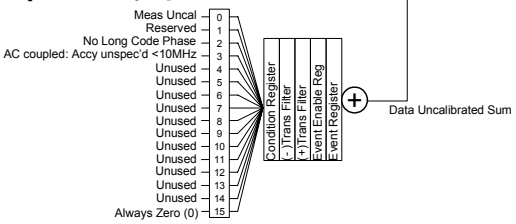
STATus:QUEStionable:INTegrity:SIGNal [for Base Analyzer]



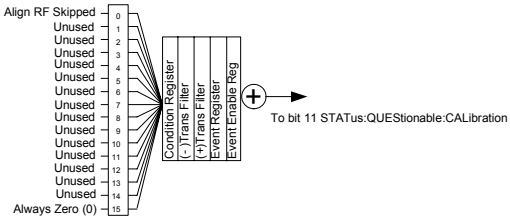
STATus:QUEStionable:INTegrity [for Base Analyzer]



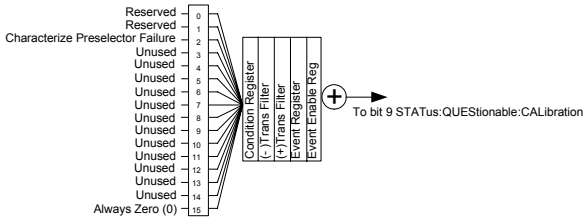
STATus:QUEStionable:INTegrity:UNCalibrated [for Base Analyzer]



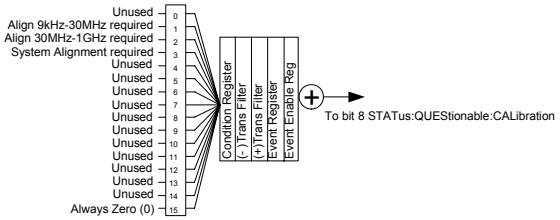
STATus:QUEStionable:CALibration:SKIPped



STATus:QUEStionable:CALibration:EXTended:FAILure



STATus:QUEStionable:CALibration:EXTended:NEEDed



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.

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:

1. Determine which register contains the bit that reports the condition.
2. Send the unique SCPI query that reads that register.
3. 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).

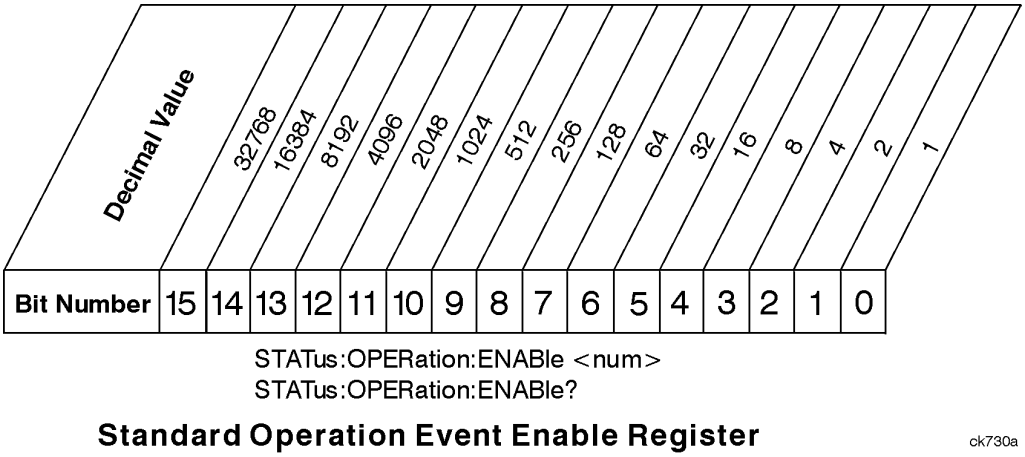
You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the event register is cleared. Querying the event register allows you to detect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

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

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

1. Set INITiate:CONTinuous off.

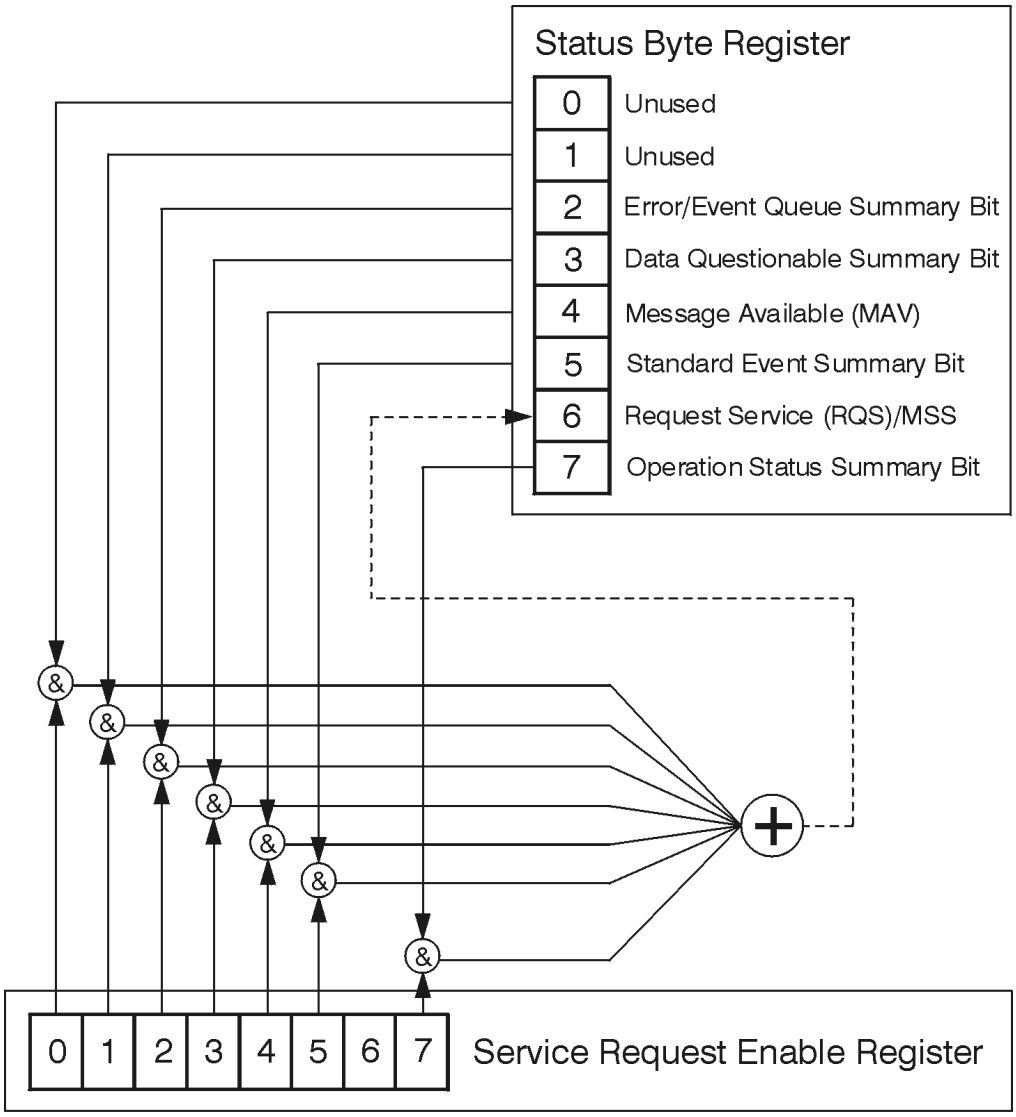
2. Set/enable the status registers.

3. Restart the measurement (send INIT).

Status Register System

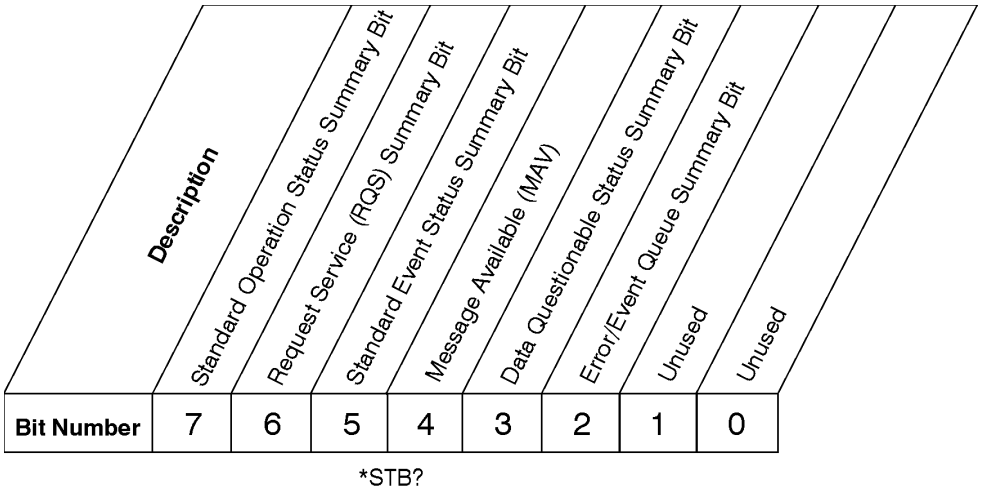
The hardware status registers are combined to form the instrument status system. Specific status bits are assigned to monitor various aspects of the instrument operation and status. See the diagram of the status system above for information about the bit assignments and status register interconnections.

The Status Byte Register



ck776a

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



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

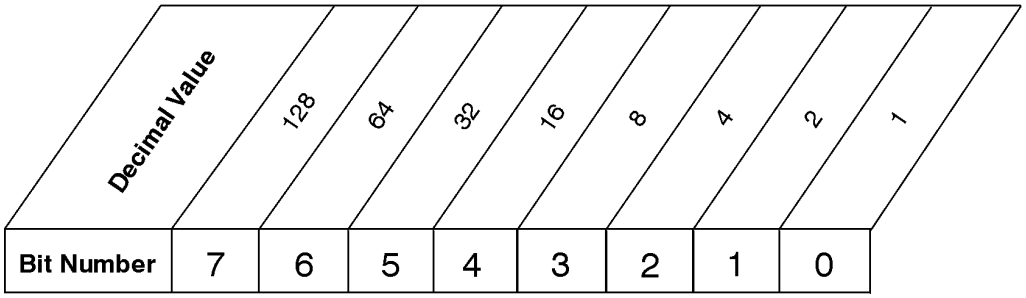
To query the status byte register, send the command *STB? The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The *STB command does not clear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

In addition to the status byte register, the status byte group also contains the service

request enable register. This register lets you choose which bits in the status byte register will trigger a service request.

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

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

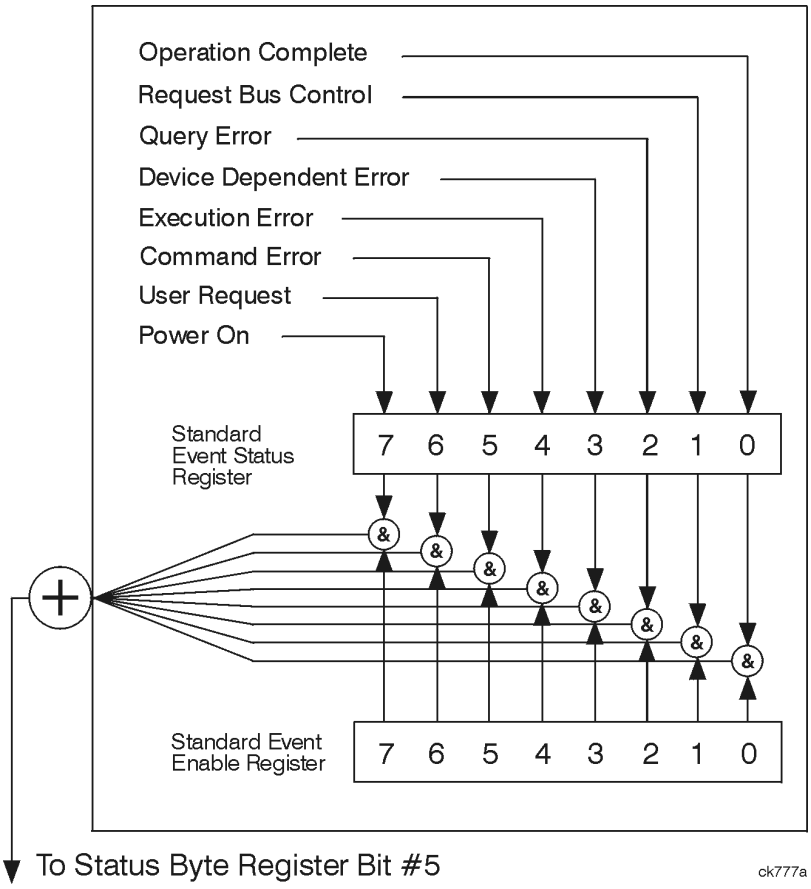


*SRE <num>
*SRE?

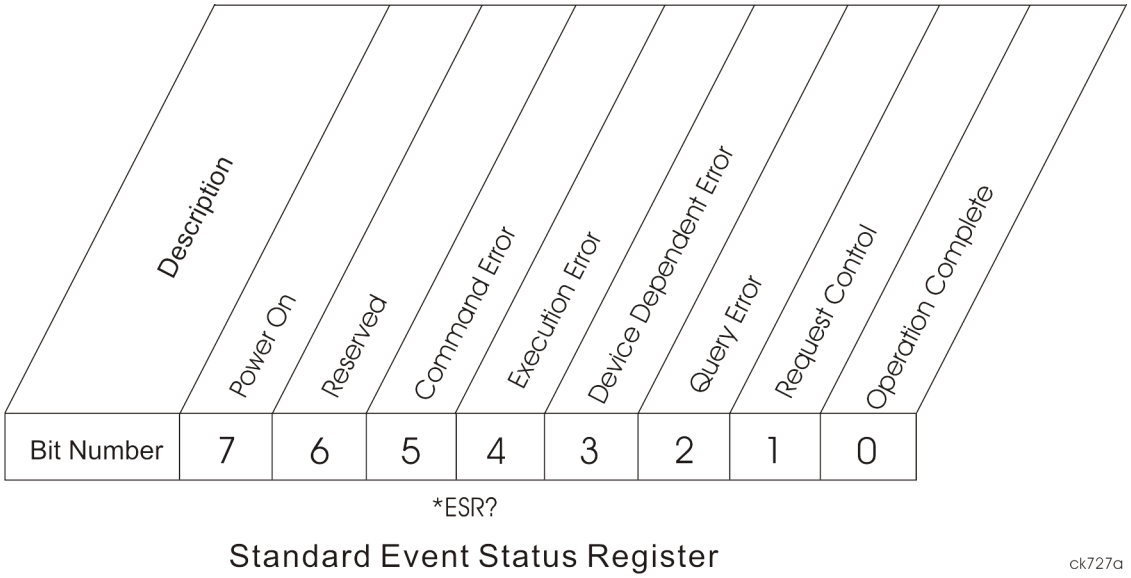
Service Request Enable Register

ck726a

Standard Event Status Register



The standard event status register contains the following bits:



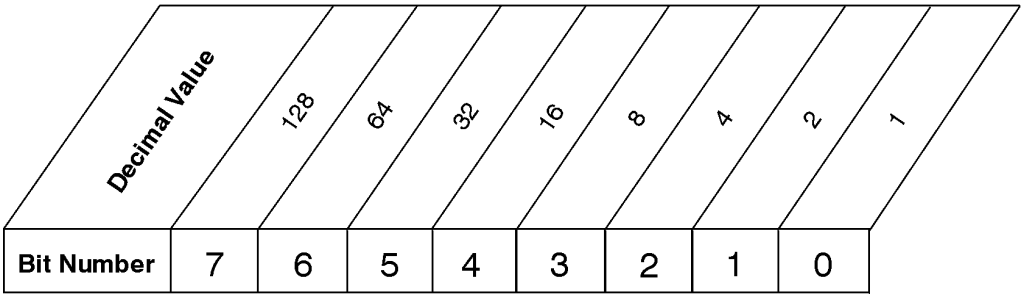
Bit	Description

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).



Standard Event Status Enable Register ck728a

Operation and Questionable Status Registers

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

Operation Status Register

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

Bit	Condition	Operation
0	Calibrating	The instrument is busy executing its Align Now process
3	Sweeping	The instrument is busy taking a sweep.
4	Measuring	The instrument is busy making a measurement. Measurements often require multiple sweeps. They are initiated by keys under the MEASURE key or with the MEASure group of commands. The bit is currently only valid for Modes: ESA/PSA: Spectrum Analysis, Phase Noise, and ESA: Bluetooth, cdmaOne, GSM
5	Waiting for trigger	The instrument is waiting for the trigger conditions to be met, then it will trigger a sweep or measurement.
8	Paused	The instrument is paused (waiting) because you have pressed the Pause Meas Control key or send the INITiate:PAUSe command. Bit is currently only valid for Modes: ESA/PSA: Spectrum Analysis, Phase Noise, and ESA: Bluetooth, cdmaOne, GSM

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

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

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
SCPI Status Bits/OPC Dependencies	Sequential command

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.

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.

R&D: There is little reason to have any bits enabled for typical manufacturing tests. Enabling bits in this register would be of more value during test development.

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
SCPI Status Bits/OPC Dependencies	Sequential command

Operation Event Query

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

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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

Questionable Register

Questionable Condition

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

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
SCPI Status Bits/OPC Dependencies	Sequential command

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.

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 16  Sets the register so that temperature summary will be reported to the Status Byte Register` `: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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Event Query

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

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
SCPI Status Bits/OPC Dependencies	Sequential command

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 16  Temperature summary 'questionable cleared' will be reported to the Status Byte Register.` `: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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Calibration Register

Questionable Calibration Condition

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

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Calibration Skipped Register

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Calibration Extended Failure Register

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Frequency Register

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Integrity Register

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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

SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Power Register

Questionable Power Condition T

his 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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Power Event Query

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

NOTE he 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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

Questionable Temperature Register

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

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
SCPI Status Bits/OPC Dependencies	Sequential command

IEEE Common GPIB Commands

Numeric values for bit patterns can be entered using decimal or hexi-decimal representations. (i.e. 0 to 32767 is equivalent to #H0 to #H7FFF).

Calibration Query

*CAL? Performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment fails. The equivalent SCPI command is CALibrate[:ALL]?

See section Alignmentsfor details of *CAL?.

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.

Remote Command	`*CLS`
Example	*CLS Clears the error queue and the Status Byte Register.
Remote Command Notes	For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem.
Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
SCPI Status Bits/OPC Dependencies	Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also.

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.

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.
Remote Command 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
Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
SCPI Status Bits/OPC Dependencies	Event Enable Register of the Standard Event Status Register.

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.
SCPI Status Bits/OPC Dependencies	Standard Event Status Register (bits 0 – 7).
Remote Command Notes	For related commands, see the `STATus` subsystem commands.
Preset	0
Min	0
Max	255

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

Remote Command	`*IDN?`
Example	*IDN? Returns instrument identification information, such as: Agilent Technologies,N9020A,US01020004,A.01.02
Key Path	**No equivalent key. See related key System, Show System.**

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.
SCPI 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.

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?`

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.
Restriction and Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.
SCPI Status Bits/OPC Dependencies	The command is sequential.
Min	0
Max	127

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.
Restriction and Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers.
SCPI Status Bits/OPC Dependencies	The command is sequential.
Min	0
Max	127

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.
SCPI Status Bits/OPC Dependencies	Service Request Enable Register (all bits, 0 – 7).
Remote Command Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	255
Min	0
Max	255

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.
SCPI Status Bits/OPC Dependencies	Status Byte Register (all bits, 0 – 7).
Remote Command Notes	See related command *CLS.

Trigger

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

Remote Command	`*TRG`
Example	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Remote Command Notes	See related command :INITiate:IMMediate.
Key Path	**No equivalent key. See related keys Single and Restart.**

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.

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.
SCPI 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.

Quick Save

The Quick Save front panelkey repeats the most recent save which was performed from the Save menu, with some qualification:

Quick Save pays no attention to register saves. Register saves are not remembered as Saves for the purpose of Quick Save

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 in the last save directory by creating a unique filename using the Auto File Naming algorithm described in the Save section.

If Quick Save is pressed after startup before any qualified Save has been performed, the Quick Save 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 pupose of subsequent Quick Saves.

Remote Command Notes	No remote command for this key specifically.
Key Path	**Quick Save**

Save

Save functionality is common across multiple Modes and Measurements. These common features are described in this section.

The Save feature prompts you to essentially answer the questions: What do you want to save? And where do you want to save it? Once these questions are answered the save can occur. The options in this menu answer the question, “What do you want to save?”

Accesses a menu that provides the save type options. The **Save Type** options are **State**, **Trace**, **Data,** or a **Screen Image** depending on the active mode.

Mode	All
Key Path	**Save**
Remote Command Notes	No remote command for this key specifically.

State

Selects **State** as the save type and accesses a menu that provides the options of where to save. You can save either to a register or a file. This menu key will not actually cause the save until the location is chosen.

Saving the state is the only way to save this exact measurement context for the current active mode. The entire state of the active mode is saved in a way that when a recall is requested, the mode will return to as close as possible the context in which the save occurred. This includes all settings and data for only the current active mode.

It should be noted that the Input/Output settings will be saved when saving State, since these settings plus the state of the mode best characterize the current context of the mode, but the mode independent System settings will not be saved.

This softkey will not actually cause the save, since the save feature still needs to know where to save the state. Pressing this key will bring up the Save State menu that provides the user with these options.

For rapid saving, the State menu lists registers to save to, or the user can select a file to save to. Once they pick the destination of the save in the State menu, the save will occur.

Mode	All
Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Remote Command Notes	See .
Key Path	**Save**

Register 1 thru Register 6

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. Only the State save type supports writing to registers. The other save types can only write to files. 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.

These 6 registers are all that is available from the front panel for all modes in the instrument. There are not 6 registers available for each mode. From remote, 127 Registers are available. Registers are files that are visible to the user in the same folder as other State Files.

Mode	All
Example	*SAV 1
Key Path	Save, State

Mode	All
Example	*SAV 2
Key Path	Save, State

Mode	All
Example	*SAV 3
Key Path	Save, State

Mode	All
Example	*SAV 4
Key Path	Save, State

Mode	All

Example	*SAV 5
Key Path	Save, State

Mode	All
Example	*SAV 6
Key Path	Save, State

To File . . .

Accesses a menu that enables you to select the location for saving the State. This menu is similar to a standard Windows® **Save As** dialog.

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). This path is the **Save In:** path in the **Save As** dialog for all State Files when they first enter this dialog.

Mode	All
Key Path	**Save, State**

Save As . . .

This menu lets you select the location where you can save the State. 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 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).

When you first enter this dialog, the path in the **Save In:** field depends on the data type.

The only files that are visible are the *.state files and the Save As type is *.state, since .state is the file suffix for the State Save Type.

Mode	All
Key Path	**Save, State**

Save

Saves all of the State of the currently active mode plus the system level Input/Output settings to the specified file.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single sweep icon. After the save completes, the Advisory Event “File <register number> saved” is displayed.

Mode	All
SCPI Command	`:MMEMory:STORe:STATe <filename>`
Example	:MMEM:STOR:STAT “myState.state” saves the file myState.state on the default path
Key Path	**Save, State, To File…**
Restriction and Notes	If 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 a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the State menu and the Save As dialog goes away.

Trace (+State)

Selects a state file which includes trace data for recalling as the save type and accesses a menu that enables you to select which trace to save. Not all modes support saving trace data with the state; and for modes that do, not all measurements do. This key is grayed out for measurements that do not support trace saves. It is blanked for modes that do not support trace saves. Saving **Trace** is identical to saving **State** except a .trace extension is used on the file instead of .state, and internal flags are set in the file indicating which trace was saved. You may also select to save ALL traces.

This softkey will not actually cause the save, since the save feature still needs to know which trace to save and where to save it. Pressing this key will bring up the Save Trace

menu that provides the user with these options.

Mode	SA
Example	MMEM:STOR:STATe TRACE2,"MyTraceFile.trace" This stores trace 2 data in the file MyTraceFile.trace in the default directory.
Remote Command Notes	See .
Key Path	**Save**

From Trace

Accesses a menu that enables you to select the trace to be saved. You can choose either **1**, **2**, **3**, **4**, **5**, **6** or **All**. Not all modes have the full six treaces. Once a trace is selected, the key returns back to the Save Trace menu and the selected trace number is annotated on the key. The default is **Trace 1**. To save the Trace you must select **Save As**.

These softkeys let you pick which trace to save. Now you have selected exactly what needs to be saved. In order to trigger a save of the selected **Trace**, you must select the **Save As** key in the Save Trace menu.

Mode	SA
Key Path	**Save, Trace + State**

Save As . . .

This menu lets you select the location where you can save the Trace. It 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 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).

When you first enter this dialog, the path in the **Save In:** field depends on the data type. The only files that are visible are the *.trace files and the Save As type is *.trace, since

.trace is the file suffix for the Trace Save Type.

Mode	SA
Key Path	**Save, Trace (+State)**
Restriction and Notes	Brings up Save As dialog for saving a Trace Save Type

Save

This key initiates the save of the .trace file. All of the State of the currently active mode plus the system level Input/Output settings are saved to the specified file as well as all of the trace data, including internal flags set in the file indicating which trace is to be saved.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single sweep icon. After the save completes, the Advisory Event “File <register number> saved” is displayed.

Mode	SA
SCPI Command	`:MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL,<filename>`
Example	:MMEM:STOR:TRAC TRACE1,“myState.trace” saves the file myState.trace on the default path and flags it as a “single trace” file with Trace 1 as the single trace (even though all of the traces are in fact stored). :MMEM:STOR:TRAC ALL,“myState.trace” saves the file myState.trace on the default path and flags it as an “all traces” file
Remote Command Notes	Some modes and measurements do not have available all 6 traces. The Phase Noise mode command, for example, is: MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|ALL,<filename> This command actually performs a save state, which in the Swept SA measurement includes the trace data. However it flags it (in the file) as a “save trace” file of the specified trace (or all traces).
Key Path	**Save, Trace, Save As…**
Restriction and Notes	If 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 a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the State menu and the Save As dialog goes away.

Data (Mode Specific)

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.

For any given measurement, the Export Data and Import Data menus match, but keys in Import Data are blanked if the data type is supported for Save but not for Recall.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows the user to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save softkey is pressed. See section Save As . . . for more details.

Mode	All
Key Path	Save
Remote Command Notes	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 if there are no measurements in Mode that supports it.
Preset	<mode specific>; Is not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode. (Refer to the mode Save/Recall PD for this Preset value).

Trace

Pressing this key selects Traces as the data type to be exported with this save request. Pressing this key when it is already selected brings up the **Trace** Menu, which allows you to select which Trace to save. This is the same as the **Select Trace** menu under Trace. The trace selected on that menu appears selected here, and selecting a trace here causes the same trace to be selected on the Select Trace menu. (That is, there is only one “selected trace”.) This key is grayed out when measurements are running that do not support trace exporting.

Mode	SA | Analog Demod | VSA

Example	MMEM:STOR:TRAC:DATA TRACE3,"MyTraceFile.csv" This stores the specified trace data in the file MyTraceFile.csv in the default directory. VSA Example: MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON
Remote Command Notes	See .
Dependencies	Trace data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Preset	1. Not part of Preset, but is reset by Restore Mode Defaults and survives power cycles.
State Saved	Saved in State
Key Path	**Save, Data**

Trace selection

These softkeys let you pick which Trace to save. The traces may have names, or they may be labeled **1**, **2**, **3**, **4**, **5**, or **6**, depending on the current mode. Once selected, the key returns back to the Export Data menu and the selected trace name/number is annotated on the key. Now you have selected exactly what needs to be saved. In order to trigger a save of the selected trace, you must select the **Save As** key in the Export Data menu.

Some measurements have an "ALL" selection. This saves all six traces in one .csv file with the x-axis data in the first column and the individual trace data in succeeding columns. The header data and x-axis data in this file reflect the current settings of the measurement. Note: any traces which are in View or Blank may have different x-axis data than the current measurement settings; but this data will not be output to the file.

An example of using this menu is: If you select 4, Trace 4 is saved to the file selected or entered in **File Name** option in the **Save As** dialog.

Mode	SA | Analog Demod | VSA
Key Path	**Save, Data, Trace**
Preset	The first trace key shown.

Include Header

The trace header information includes enough state information to display the trace data with the same formatting and scaling when it is recalled. However, no other instrument state information is saved. If headers are not saved, the scaling and format are set to

defaults when the trace is recalled.

Mode	VSA
SCPI Example	MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON !The On/Off setting is the last variable passed in the MMEMory:STORe:TRACe:DATA command.
Key Path	**Save, Data, Trace**
Preset	On

Measurement Results

Different types of results are available for each particular measurement. The results that are available are documented under the individual measurements. These measurement results are the same as the results that are returned when using the MEASure:<measurement> command (usually for sub-opcode 1).

Measurement results are not available for all measurements. For example, this key is grayed out in the Spectrum Analyzer Mode when the active measurement is Swept SA.

Mode	SA | ADEMOD | BASIC(IQ Analyzer) | CDMA2K | GSMEDGE | PNOISE | WCDMA | WIMAXOFDMA | TDSCDMA
Example	MMEM:STOR:RES "MyResultsFile.xml" This stores the measurement results data in the file MyResultsFile.xml in the default directory.
Remote Command Notes	See .
Key Path	Save, Data
Dependencies	The key will not show if no measurements in the Mode support it.

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data (unprocessed).

Mode	WCDMA
Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.

Remote Command Notes	See .
Key Path	Save, Data

Zone Map

A map file contains zone definitions that will help simplify making measurements of frequently used signals. The OFDMA frame structure can contain multiple-zone definitions for the uplink and downlink subframes and multiple data burst allocations. You can store map files in which you have saved complicated OFDMA frame analysis zone definitions. This can save you time and ensure the accuracy of repeated measurements. Map files are also useful for recreating measurement settings so they can be used by other users.

Mode	OFDMA WiMAX
Example	MMEM:STOR:ZMAP "MyZonemapFile.omf" This stores the zone map data in the file MyZonemapFile.omf in the default directory.
Remote Command Notes	See .
Key Path	Save, Data

Recorded Data

Saving recorded data is not available for all measurements. Recorded data, and the optional header info, may be recalled later (or transferred to another instrument) for analysis.

This function is available in 89601X VSA Option 200, but not in Option 205.

Mode	VSA
SCPI Example	MMEM:STOR:REC "MyRecording.sdf",SDF,ON,ON,OFF
Restriction and Notes	Greyed out unless there is recorded data in the buffer.
Key Path	Save, Data (Export)

Save As . . .

This menu lets you select the location where you can save Data Type files. It 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.

When you first enter this dialog, the path in the **Save In:** field depends on the data type. The only files that are visible are the files with the corresponding data type suffix, and the **Save As** type lists the same suffix.

For example, if the Data Type is **Amplitude Corrections**, the file suffix is .csv and the *.csv files are the only visible files in the **Save As** dialog and .csv is the Save As Type.

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
```

Mode	All
Key Path	**Save, Data**
Restriction and Notes	Brings up Save As dialog for saving a <mode specific> Save Type

Save

Saves the specified Data Type. This section describes any specific save behavior relevant to Data that is common to all modes.

When a **Save** of a specific Data File is requested, the specified data is saved to the specified or selected file. The save is performed immediately and does not wait until the measurement is complete.

If the file already exists, a dialog will popup that allows you to replace the existing file by selecting an **OK** or you can **Cancel** the request.

While the save is being performed, the floppy icon will show up in the settings bar near the Continuous/Single icon. After a register save completes, the corresponding register softkey

annotation is updated with the date the time and an advisory message that the file was saved appears in the message bar.

Key Path	**Save, Data, Save As…**
Restriction and Notes	If 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 a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Mode	SA | ADEMOD | BASIC(IQ Analyzer) | CDMA2K | GSMEDGE | PNOISE | WCDMA | WIMAXOFDMA | TDSCDMA
SCPI Command	`:MMEMory:STORe:RESults <filename>`
Example	:MMEM:STOR:RES “myResults.csv” saves the results from the current measurement to the file myResults.csv in the default path. :MMEM:STOR:RES “MyDocuments\Basic\data\ComplexSpectrum\results\myResults.xml” saves the results from the current measurement (Complex Spectrum) to the file myResults.xml in the default path for IQ Analyzer (Basic) Mode.

Mode	SA | Analog Demod
SCPI Command	`:MMEMory:STORe:TRACe:DATA TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | ALL,<filename>`
Example	:MMEM:STOR:TRAC:DATA TRACE2,”myTrace2.csv” exports the 2nd trace to the file myTrace2.csv in the default path.
Remote Command Notes	Not all measurements have the ALL selection. 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 remote.

Trace Number	Analog Demod Mode: Trace Names
TRACE1	RF Spectrum
TRACE2	Demod

Trace Number	Analog Demod Mode: Trace Names
TRACE3	Demod Ave
TRACE4	Demod Max
TRACE5	Demod Min
TRACE6	AF Spectrum

Mode VSA

SCPI Command

```
:MMEMory:STORe:TRACe:DATA
TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,"<filename>"[,
CSV|TXT|SDF[,OFF|ON|0|1]]
```

SCPI Example MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON

Restriction and Notes If you are not licensed to save a particular file type, then an error will be returned. If an invalid file format is specified or the file cannot be saved successfully, then an error is returned.

8901X Option 205 allows export in TXT, CSV, and SDF formats.

8901X Option 200 allows the Option 205 formats and additionally: Matlab 4, 5 and HDF5, and an N5110A compatible binary format.

Remote Command Notes File format is selected by the second parameter, but no default extension is appended to the filename. If the second parameter is not supplied, then the filename extension is used to determine the format. *.mat selects Matlab 5 format. *.sdf, or an unrecognized extension chooses the SDF fast format.

The optional Boolean determines if the file is saved with headers. By default the headers are saved.

Mode WCDMA

SCPI Command

```
:MMEMory:STORe:CAPTured <filename>
```

Example :MMEM:STOR:CAPT “MyDocuments\WCDMA\data\captureBuffer\myCaptureBuffer.bin” saves the capture buffer data from the current measurement to the file myCaptureBuffer.bin in the default path.

Restriction and Notes If 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 a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.

Key Path Save, Data, Save As

Mode	WIMAXOFDMA
SCPI Command	`:MMEMory:STORe:ZMAP <filename>`
Example	:MMEM:STOR:ZMAP “myZoneMap.omf” saves current Zone Map as 89601 compatible file type.
Key Path	**Save, Data, Zone Map**
Restriction and Notes	If a file with the same name already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk overwriting the file during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Once a save is complete, the Export Data menu will appear, and the Save As dialog will disappear. The message “File <file name> saved” will appear after the save is complete.

Mode	VSA
SCPI Command	`:MMEMory:STORe:RECording <filename>[,SDF|SDFX|CSV|TXT|MAT4|MAT|HDF5|BIN[,OFF|ON|0|1[,OFF|ON|0|1[,OFF|ON|0|1]]]]`
SCPI Example	MMEM:STOR:REC "MyRecording.sdf",SDF,ON,ON,OFF
Remote Command Notes	Recorded data must be available in the buffer. File format is selected by the second parameter, but no default extension is appended to the filename.If the second parameter is not supplied, then the filename extension is used to determine the format. *.mat selects Matlab 5 format. *.sdf, or an unrecognized extension chooses the SDF fast format. The three optional Booleans determine if: 1. file is saved with headers 2. data is resampled to the current span before saving 3. player position settings limit the data saved

Screen Image

Accesses a menu of functions that enable you to specify a format and location for the saved screen image.

Pressing **Screen Image** bbrings up a menu which 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.

NOTE For some software versions, if you initiate a screen image save by navigating through the Save menus, then 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. For this reason the Quick Save front-panel key is provided, which repeats the last save performed, using an auto-named file. To get an exact image of the screen just the way you want it, set up the Quick Save by first performing a Screen Image save through the menus under the Save front-panel key. Then any subsequent press of Quick Save will grab an immediate snapshot of what is on the screen and automatically assign it a file name. (You may then discard the initial save, if desired.)

Mode	All
Example	MMEM:STOR:SCR "MyScreenFile.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Remote Command Notes	See .
Key Path	**Save**

Themes

Accesses a menu of function 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 the user to pick between themes to be used when saving the screen image.

Key Path	Save, Screen Image, 1
SCPI Name	Themes
SCPI Command	`:MMEMory:STORe:SCReen:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:MMEMory:STORe:SCReen:THEMe?`
Setup	`:SYSTem:DEFault MISC`

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
Example	`MMEM:STOR:SCR:THEM TDM`

3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes, 1
Example	`MMEM:STOR:SCR:THEM TDC`

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, 2
Example	`MMEM:STOR:SCR:THEM TDM`

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, 3
Example	`MMEM:STOR:SCR:THEM FCOL`

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, 4
Example	`MMEM:STOR:SCR:THEM FMON`

Save As…

Accesses a menu that enables you to select the location where you can save the Screen Image. This menu is a standard Windows® dialog with Save As menu keys. The **Save As** dialog is loaded with the file information related to the Screen Image Type. The filename is filled in using the auto file naming algorithm for the Screen Image Type and is highlighted. The only files that are visible are the `*.png files` and the Save As Type is `*.png`, since `.png` is the file suffix for the Screen Image Type.

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).

This path is the **Save In:** path in the **Save As** dialog for all Screen Files when the user first enters this dialog.

Key Path	**Save, Screen Image, 2**
Restriction and Notes	Brings up Save As dialog for saving a Screen Image Save Type

Save

Saves the screen image to the specified file using the selected theme. The image that is saved is the measurement display prior to when the **Save As** dialog appeared. The save is performed immediately and does not wait until the measurement is complete.

SCPI Command	`:MMEMory:STORe:SCReen <filename>`
Example	:MMEM:STOR:SCR “myScreen.png”
Restriction and Notes	If 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 a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote. Auto return to the Screen Image menu and the Save As dialog goes away. Advisory Event “File <file name> saved” after save is complete.
Key Path	**Save, Screen Image, Save As..., 1**

Save As . . .

The **Save As** is a standard Windows dialog and with the Save As key menu. 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 **Save As** dialog will have the last path loaded in **Save In:** for this particular file type. User specified paths are remembered and persist through subsequent runs of the mode. These remembered paths are mode specific and are reset back to the default using **Restore Mode Defaults**.

Save

Performs the actual save to the specified file of the selected type. The act of saving does not affect the currently running measurement and does not require you to be in single measurement mode to request a save. It performs the save as soon as the currently running measurement is in the idle state; when the measurement completes. This ensures the State or Data that is saved includes complete data for the current settings. The save only waits for the measurement to complete when the state or data that depends on the measurement setup is being saved. The save happens immediately when exporting corrections or when saving a screen image.

If the file already exists, a dialog will popup with corresponding menu keys that allows you to replace the existing file with an **OK** or to **Cancel** the request.

While the save is being performed, the floppy icon shows up in the settings bar near the Continuous/Single icon. After the save completes, the corresponding register menu key annotation is updated with the date the time and the message “File <file name> saved” appears in the message bar.

Restriction and Notes	If the file already exists, the File Exist dialog pops up and allows the user to replace it or not by selecting the Yes or No menu keys that appear with the dialog. (For more details, refer to the File Services PD). Then the key causes an auto return and Save As dialog goes away. Advisory Event “File <file name> saved” after save is complete.

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.

Key Path	Save, <various>, Save As…, 2
Restriction and Notes	Pressing this key navigates the user to the files and folders list in the center of the dialog.

File Name

Brings up the Alpha Editor as shown in the screen image. Use the knob to choose the letter to add and the **Enter** front panel key to add the letter to the file name. In addition to the list of alpha characters, this editor includes a **Space** menu key and a **Done** menu key. The **Done** menu key completes the filename, removes the Alpha Editor and returns back to the **File Open** dialog and menu, but does not cause the save to occur. You can also use **Enter** to complete the file name entry and this will cause the save to occur.

Key Path	Save, <various>, Save As…, 3
Restriction and Notes	Brings up the Alpha Editor. Editor created file name is loaded in the File name field of the Save As dialog.

Save As Type

This key corresponds to the **Save As Type** selection in the dialog. It follows the standard Windows® supported **Save As Type** behavior. It shows the current file suffix that corresponds to the type of file you have selected to save. If you navigated here from saving State, “State File (*.state)” is in the dialog selection and is the only type available under the pull down menu. If you navigated here from saving Trace, “Trace+State File (*.trace)” is in the dialog selection and is the only type available under the pull down menu. If you navigated here from exporting a data file, “Data File (*.csv)” is in the dialog and is available in the pull down menu. Modes can have other data file types and they would also be listed in the pull down menu.

Key Path	Save, <various>, Save As…, 4
Restriction and Notes	Pressing this key causes the pull down menu to list all possible file types available in this context. All types available are loaded in a 1-of-N menu key for easy navigation.

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. It follows the standard Windows® supported **Up One Level** behavior. When pressed,

it causes the file and folder list to navigate up one level in the directory structure.

Key Path	Save, <various>, Save As..., 5
Restriction and Notes	When pressed, the file and folder list is directed up one level of folders and the new list of files and folders is displayed

Create New Folder

This key corresponds to the icon of a folder with the "*" that is in the tool bar of the dialog. It follows the standard Windows® supported **Create New Folder** behavior. When pressed, a new folder is created in the current directory with the name **New Folder** and allows you to enter a new folder name using the Alpha Editor.

Key Path	Save, <various>, Save As..., 6
Restriction and Notes	Creates a new folder in the current folder and lets the user fill in the folder name using the Alpha Editor.

Cancel

This key corresponds to the **Cancel** selection in the dialog. It follows the standard Windows supported **Cancel** behavior. It causes the current **Save As** request to be cancelled.

Key Path	Save, <various>, Save As..., 7
Restriction and Notes	Pressing this key causes the Save As dialog to go away and auto return.

Recall

Recall functionality is common across multiple Modes and Measurements. These common features are described in this section.

The Recall feature prompts you to answer the questions: What do you want to recall? And to where do you want to recall it? Once these questions are answered the recall can occur. The options in this menu answer the question "What do you want to Recall?" The options are **State**, **Trace** and **Data**. (**Screen Imag**e can be saved, but not recalled.) The default paths for **Recall** are data type dependent and are the same as for **Save**.

Key Path	**Recall**
Remote Command Notes	No remote command directly controls the Recall Type that this key controls. The Recall type is a node in the :MMEM:LOAD command. An example is :MMEM:LOAD:STATe <filename>.

State

Accesses a menu that enables you to recall a Stated that has previously been saved. Recalling a saved state returns the analyzer as close as possible to the mode context and may cause a mode switch if the file selected is not for the current active mode. A State file can be recalled from either a register or a file. Once you pick the source of the recall in the State menu, the recall will occur.

When this key is pressed, the user has determined what they want to recall is **State**. Recalling **State** is used to return as close as possible to the mode context of the save. Recalling State may cause a mode switch if the file selected is not for the currently active mode. This menu key will not actually cause the recall, since the recall feature still needs to know from where to recall the state. **State** can be recalled from either a register or a file. Pressing this key will bring up the State menu that provides the user with the options of where to retrieve the state. For quick recalls, the State menu lists 6 registers to recall from or the user can select a file to recall from.

Mode	All
Key Path	**Recall**
Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Remote Command Notes	See .

Register 1 thru Register 6

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Only the Recall Type of State supports reading from registers. The other Recall Types can only read from files. Each of the register keys annotates whether it is empty or at what date and time it was last modified.

Registers are shared by all modes, so recalling from any one of the 6 registers may cause a mode switch to the mode that was active when the save to the Register occurred.

After the recall completes, the message “Register <register number> recalled” appears in the message bar.

Selecting any one of these register menu keys: **Register 1**, **Register 2**, **Register 3**, **Register 4**, **Register 5**, **Register 6** causes the state of the mode from the specified Register to be recalled. The registers are provided for easy saving and recalling, since the user does not have to specify a filename or navigate to a specific file. The date will follow the format specified in the Date Format setting under the **Control Panel**. The time will show hours, minutes and seconds.

Key Path	Recall, State
Example	*RCL 1

Key Path	Recall, State
Example	*RCL 2

Key Path	Recall, State
Example	*RCL 3

Key Path	Recall, State
Example	*RCL 4

Key Path	Recall, State
Example	*RCL 5

Key Path	Recall, State
Example	*RCL 6

From File\ File Open

Brings up the **File Open** standard Windows® dialog and its corresponding **File Open** key menu.

When you first enter this dialog, the State File default path is in the **LookIn:** box in this File Open dialog. The File Open dialog is loaded with the file information related to the State Save Type. The first *.state file is highlighted. The only files that are visible are the *.state `files` and the Files of type is *.state, since .state is the file suffix for the State Save Type.

Key Path	**Recall, State**
Restriction and Notes	Brings up Open dialog for recalling a State Save Type

Open

Recalling State function first must verify 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, and then loading the State from the saved state file to as close as possible to the context in which the save occurred. 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 still tries to recall as much as possible and it returns a warning message of what it did.

NOTE	No Trace data is loaded when recalling a State File. Measurements that support loading of trace data will include a Trace key in the Recall menu and will load State + Trace data from .trace files under that key.

SCPI Command `:MMEMory:LOAD:STATe <filename>`

Example	:MMEM:LOAD:STAT “myState.state” recalls the file myState.state on the default path
Remote Command Notes	Although the trace data is included in the .state file it is not recalled; that is left for .trace files only for measurements that support recalling of trace data. Errors are generated if the specified file is empty or does not exist, or there is a file type mismatch.
Key Path	**Recall, State, From File…**

The state of a mode includes all of the variables affected by doing a full preset. It not only recalls Mode Preset settings, but it also recalls all of the mode persistent settings and data if the mode has either. Each mode determines whether data is part of mode state and if the mode has any persistent settings. **Recall State** also recalls all of the **Input/Output** system settings, since they are saved with each State File for each mode.

The **Recall State** function does the following:

Verifies that the file is recallable on this instrument using the version number and model number.

Aborts the currently running measurement.

Clears any pending operations.

Switches to the mode of the selected Save State file.

Sets mode State and Input/Output system settings to the values in the selected Saved State file.

Limits settings that differ based on model number, licensing or version number.

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

Trace (+State)

When this key is pressed, the user has determined what they want to recall is **Trace**. Trace files include the state of the mode they were saved from as well as the trace data, with internal flags to indicate which trace the user was trying to save which may include ALL traces. They are otherwise identical to State files. Recalling **Trace** may cause a mode switch if the file selected is not for the currently active mode.

Not all modes support saving of trace data with the state; and for modes that do, not all measurements do. The **Trace** key is grayed out for measurements that do not support trace recall. It is blanked for modes that do not support trace recall.

This softkey will not actually cause the recall, since the recall feature still needs to know from which file to recall the trace and which trace to recall it into. Pressing this key will

bring up the Recall Trace menu that provides the user with the options of where to retrieve the trace.

Mode	SA
Example	MMEM:LOAD:TRAC TRACE2,"MyTraceFile.trace" This loads the trace file data (on the default file directory path) into the specified trace.
Remote Command Notes	See .
Key Path	**Recall**

To Trace

These softkey selections let you pick which Trace to recall the saved trace into; either 1, 2, 3, 4, 5, or 6. Not all modes have the full 6 traces available. The default is trace 1. If the .trace file is an “all trace” file, “**To Trace**” is ignored and the traces each go back to the trace they were saved from.

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. In order to trigger a recall of the selected Trace, you must select the **Open** key in the Recall Trace menu.

Mode	SA
Key Path	**Save, Data, Trace**

Open…

Pressing **Open** brings up the File Open standard Windows dialog and its corresponding File Open softkey menu. When the user navigates to this selection, they have already determined they are recalling **Trace** and now they want to specify from which file to do the recall.

When the user first enters this dialog, the State File default path is in the **LookIn:** box in this **File Open** dialog. The **File Open** dialog is loaded with the file information related to the State Save Type. The first *.trace file is highlighted. Also, the only files that are visible are the *.trace `files` and the Files of type is *.trace, since .trace is the file suffix for the Trace Save Type.

Mode	SA
Key Path	**Recall, Trace**

Restriction and Notes	Brings up Open dialog for recalling a Trace Save Type

Open

Recalling **Trace** first must 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, loads the state from the saved state file to as close as possible to the context in which the save occurred. Users 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 wipe out 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.

In every other way a Trace load is identical to a State load. See section for details.

Key Path	**Recall, Trace, Open**
Restriction and Notes	Auto return to the Trace menu and the Open dialog goes away. Advisory Event “Recalled File <file name>” after recall is complete.
SCPI Command	`:MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<filename>`
Example	`:MMEM:LOAD:TRAC TRACE2,"myState.trace"` recalls the file myState.trace on the default path; if it is a “single trace” save file, that trace is loaded to trace 2, and will is set to be not updating.

Data (Mode Specific)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce the same type of data. The Import Menu only contains Data Types that are supported by the current measurement.

For any given measurement, the Export Data and Import Data menus match, but keys in Import Data are blanked if the data type is supported for Save but not for Recall.

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 will occur as soon as the Open softkey is pressed. See section File Open Dialog and Menu for more details.

Mode	SA|VSA
Key Path	Recall
Remote Command Notes	No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands.
Preset	<mode specific>; Is not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode..

Trace

This key selects the **Traces** as the data type to be imported with this recall request. It brings up the Trace Menu that lets you select which Trace to import the data into.

This key is grayed out when measurements are running that do not support trace importing.

For Vector Signal Analyzer Mode:

— the trace data is loaded into the selected data register. Trace data registers are temporary storage places for trace data. They allow you to view past results next to current measurement results, and are also used in some functions like user defined filters.They are measurement global, so you can import data into a register while in the Digital Demod measurement and view it later while in the Vector measurement. Data registers are cleared when the measurement application is terminated, but not when you change Modes and return.

— If the recalled file was saved with header information, the trace will initially be displayed with the same formatting and scaling as it had when it was saved. If headers are not saved, the scaling and format are set to defaults when the trace is recalled.

— The following trace data formats may be imported:

Text and comma-separated variable (CSV)
Text
SDF.

— Option 200 also allows import of these additional formats:

Matlab 4

Matlab 5
Matlab HDF5
N5110A compatible binary

Mode	SA | Analog Demod | VSA
Example	MMEM:LOAD:TRAC:DATA TRACE2,"MyTraceFile.csv" This loads the trace file data (on the default file directory path) into the specified trace.
Remote Command Notes	See .
Dependencies	Trace data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Preset	1; not part of Preset, but is reset by Restore Mode Defaults and survives power cycles
State Saved	Saved in State
Key Path	**Recall, Data**

Trace 1, 2, 3, 4, 5, 6

These keys let you pick which Trace to import the data into; either **1**, **2**, **3**, **4**, **5** or **6**. The default is **1**.

Once selected, the key returns back to the Import Data menu and the selected Trace number is annotated on the key. Now you have selected exactly what needs to be imported. In order to trigger a import of the selected trace, you must select the **Open** key in the Import Data menu.

An example of using this menu is: If you select 4 and continue to the File Open dialog, then import Trace 4 from the file selected or entered in **File Name** option in the File Open dialog.

Mode	SA | VSA
Key Path	**Recall, Data, Trace**

Display in Selected Trace

In Vector Signal Analyzer Mode, data registers are used as temporary storage places for trace data. A register may be displayed in any trace. If "Display in Selected Trace" softkey is set to "Yes" then the data register into which the file is recalled is then assigned to the currently selected trace.

Mode	VSA

Example	!Related command: MMEM:LOAD:TRAC:DATA D1,"TRC1.TXT",TXT !This command explicitly puts the data in the specified trace.
Key Path	Recall, Data (Import), Trace (to)

Capture Buffer

Capture Buffer functionality is not available for all measurements. The captured data is raw data (unprocessed).

Mode	WCDMA
Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Remote Command Notes	See .
Dependencies	Capture buffer data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Key Path	Recall, Data

Zone Map

A map file contains zone definitions that will help simplify making measurements of frequently used signals. The OFDMA frame structure can contain multiple-zone definitions for the uplink and downlink subframes and multiple data burst allocations. You can recall map files in which you have saved complicated OFDMA frame analysis zone definitions; this can save you time and ensure the accuracy of repeat measurements. Map files are also useful for recreating measurement settings so they can be used by other users.

Mode	OFDMA WIMAX
Example	MMEM:LOAD:ZMAP "MyZonemapFile.omf" This loads the file of zone map data (on the default file directory path) into the custom map.
Remote Command Notes	See .

Dependencies	Zone map data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Key Path	Recall, Data

Recorded Data

This allows you to recall previously saved, recorded data for analysis.

This feature is only available with 89601X VSA Option 200 and Option G01.

Mode	VSA
Example	MMEM:LOAD:REC "MyRecording.sdf"
Notes	Available file types are: • CSV (Comma delimited) (*.csv) • MAT-File (*.mat) • MAT-File (Version 4) (*.mat) • MAT-File (HDF5) (*.mat;*.hdf;*.h5) • N5110A Waveform (*.bin) • SDF (Fast) (*.sdf;*.dat) • SDF (Export) (*.sdf;*.dat) • Text (Tab delimited) (*.txt)
Key Path	Recall, Data (Import)

Open…

Pressing **File Open** brings up the File Open standard Windows dialog and the File Open key menu. When the user navigates to this selection, they have already determined they are recalling a specific Data Type and now they want to specify which file to open.

When you first enter this dialog, the path is in the **Look In:** field in this **File Open** dialog depends on which import data type you navigated here from.

The only files that are visible are those specific to the file type being recalled.

Key Path	**Recall, Data**
Restriction and Notes	Brings up Open dialog for recalling a <mode specific> Save Type

Open

The import starts by checking for errors. Then the import can start. For all data types, the actual import starts by aborting the currently running measurement. Then the import does data type specific behavior:

Trace Import: A trace cannot be imported if the trace points in the file do not match the sweep points in the mode. If this happens, an error is generated. When a trace is imported, then **Trace Update** is always turned OFF for that trace and **Trace Display** is always turned ON. The trace file has meta data. If the meta data in the file does not match the corresponding SA state, the dirty marker is displayed.

Mode	SA
SCPI Command	`:MMEMory:LOAD:TRACe:DATA TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<filename>`
Example	:MMEM:LOAD:TRAC DATA TRACE2,"myTrace2.csv" imports the 2nd trace from the file myTrace2.csv in the default path.
Remote Command Notes	Errors are reported if the file is empty or missing, or if the file type does not match.

Mode	VSA
SCPI Command	`:MMEMory:LOAD:TRACe:DATA D1|D2|D3|D4|D5|D6,<filename>[,CSV|TXT|SDF]`
SCPI Example	MMEM:LOAD:TRAC:DATA D1,"TRC1.TXT",TXT
Remote Command Notes	If the file format parameter is not included in the SCPI command, the file format is determined by the file name extension. If this is not sufficient, the file is scanned to determine the format.
Key Path	Recall, Data (Import), Trace (to), Open . . .

Recall captured data for reuse in demod measurements using the Load Capture Buffer functionality. This function is enabled for 'Code Domain' and 'Modulation Accuracy' measurements only.

Mode	WCDMA
SCPI Command	`:MMEMory:LOAD:CAPTured <filename>`
Restriction and Notes	Errors are reported if the file is empty or missing, or if the file type does not match.
Key Path	**Recall, Data, File Open**
Example	:MMEM:LOAD:CAPT "My Documents\WCDMA\data\IQ\captureBuffer\myCaptureBuffer.bin"

Mode	VSA
SCPI Command	MMEMory:LOAD:RECording <filename>
SCPI Example	MMEM:LOAD:REC "MyRecording.sdf"
Key Path	Recall, Data (Import), Recorded Data, Open . . .

Mode	WIMAXOFDMA
SCPI Name	Recall Zone Map
SCPI Command	`:MMEMory:LOAD:ZMAP <filename>`
Example	:MMEM:LOAD:ZMAP “myZoneMap.omf” recalls the Zone Map data from the file myZoneMap.omf on the default directory to the Custom Map for Modulation Analysis measurement.
Key Path	**Recall, Data, Zone Map**

File Open Dialog and Menu

The **File Open** is a standard Windows dialog and has a **File Open** key menu. Each key in this menu corresponds to the selectable items in the **File Open** dialog box. The menu keys can be used for easy navigation between the selections within the dialog or the standard **Tab** and **Arrow** keys can be used for dialog navigation. When you navigate to this selection, you have already limited the file recall type and now you want to specify which file to open.

Open

This selection and the **Enter** key when a filename has been selected or specified actually cause the load to occur. **Open** loads the specified or selected file to the previously selected recall type of either **State** or a specific import data type.

Restriction and Notes	Advisory Event “File <file name> recalled” after recall is complete.

File/Folder List

This menu key navigates to the center of the dialog that contains the list of files and

folders. Once here the user can get information about the file.

Key Path	Recall, <various>, Open…
Restriction and Notes	Pressing this key navigates the user to the files and folders list in the center of the dialog.

Sort

Pressing this key brings up the Sort menu that allows the user a way to sort the files within the File Open scope. Only one sorting type can be selected at a time and the sorting happens immediately.

Key Path	Recall, <various>, Open…
Remote Command Notes	No SCPI command directly controls the sorting.

By Date

This allows the user to sort the list of files within the scope of the **File Open** dialog in ascending or descending data order. The date is the last data modified.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

By Name

This allows the user to sort the list of files within the scope of the **File Open** dialog in ascending or descending order based on the filename.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

By Extension

This allows the user to sort the list of files within the scope of the **File Open** dialog in

ascending or descending order based on the file extension for each file.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

By Size

This allows the user to sort the list of files within the scope of the **File Open** dialog in ascending or descending order based on file size.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

Ascending

This causes the display of the file list to be sorted, according to the sort criteria above, in Ascending order.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

Descending

This causes the display of the file list to be sorted, according to the sort criteria above, in Descending order.

Key Path	Recall, <various>, Open…, Sort
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

Files Of Type

This menu key corresponds to the Files Of Type selection in the dialog. It follows the standard Windows supported Files Of Type behavior. It shows the current file suffix that corresponds to the type of file the user has selected to save. If the user navigated here from recalling State, “State File (*.state)” is in the dialog selection and is the only type available

in the pull down menu. If the user navigated here from recalling Trace, “Trace+State File (*.trace)” is in the dialog selection and is the only type available under the pull down menu. If the user navigated here from importing a data file, “Data File (*.csv)” is in the dialog and is the only type available in the pull down menu. Modes can have other data file types and they would also be listed in the pull down menu.

Key Path	Recall, <various>, Open…
Restriction and Notes	Pressing this key causes the pull down menu to list all possible file types available in this context.

Up One Level

This menu key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. It follows the standard Windows supported **Up One Level** behavior. When pressed, it causes the file and folder list to navigate up one level in the directory structure.

Key Path	Recall, <various>, Open…
Restriction and Notes	When pressed, the file and folder list is directed up one level of folders and the new list of files and folders is displayed.

Cancel

This menu key corresponds to the **Cancel** selection in the dialog. It causes the current **File Open** request to be cancelled. It follows the standard Windows supported **Cancel** behavior.

Key Path	Recall, <various>, Open…
Restriction and Notes	Pressing this key causes the Open dialog to go away and auto return.

3 Analyzer Setup Functions

This section describes generic analyzer setup functionality. These functions can change depending on the currently selected Measurement. This is common analyzer functionality information that can be used as reference material to better understand some of the unique features that are available in the different measurements in this mode.

The remote commands are mode dependent. The GSM/EDGE mode must be selected. (INSTrument:SELect EDGEGSM)

AMPTD Y Scale

Some Amplitude 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 Amplitude key activates the Amplitude menu and selects Reference Level as the active function.

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. Note that when in "Pre-Adjust for Min Clip" this value can change at the start of every measurmement.

All parameters in the Attenuation menus are Meas Global, meaning they are common to all the measurements and are unaffected by Meas Preset.

Key Path **AMPTD**

Mech Atten Auto/Man

You can modify the mechanical attenuation applied to the RF input signal path. This value is normally auto coupled to the Ref Level, the Internal Preamp Gain, any External Gain that is entered, and the Max Mixer Level, as described in the table below. However, when the electrical attenuator is enabled, there is no Auto/Man functionality for the mechanical attenuator, and the third line of the key disappears. The Auto/Man state of the key is remembered and restored when the electrical attenuator is once again disabled.

Some measurement applications have functionality that can pre-adjust the input signal for minimum clipping. That is, it attenuates the input so it does not over-drive the analyzer. When this functionality is available, the Auto/Man selection is not available.

SCPI Command

```
[:SENSe]:POWer[:RF]:ATTenuation <rel_ampl>
[:SENSe]:POWer[:RF]:ATTenuation?
```

BAF SCPI Command

```
[:SENSe]:POWer[:RF]:ATTenuation:AUTO OFF|ON|0|1
[:SENSe]:POWer[:RF]:ATTenuation:AUTO?
```

Example

```
POW:ATT 20
```

Sets the attenuator to manual mode, and sets the value to 20 dB.

Dependencies	When the electrical attenuator is enabled, the mechanical attenuator has no auto setting and Auto/Man line on the key disappears. The state of Auto/Man is remembered and restored when the electrical attenuator is once again disabled. If it is restored to Man, the mechanical attenuation is set to the sum of the current values of mechanical and electrical attenuation, but if it is restored to Auto it recouples according to the Couplings, below.
Couplings	When the Input Attenuator is in 'auto', it uses the following algorithm to determine a value. Calculate a new value = ReferenceLevel + PreAmpGain + ExternalGain – RefLevelOffset - MaxMixerLevel + IF Gain. Limit this new value to be between 6 and 70 dB for MXA (or 60 dB for EXA). No value below 6 dB can ever be chosen by Auto. The resulting value should be rounded up to the largest value possible given the attenuation step setting. That is, 50.01 dB would change to 60 dB (for a 10dB attenuation step).
Preset	Auto (usually 10 dB, On)
State Saved	Saved in State
Min	0 dB The mechanical attenuation cannot be decreased below 6 dB with the knob or step keys. To get to a value below 6 dB it has to be directly entered from the keypad or via SCPI. This protects from adjusting the attenuation to a dangerously small value which can put the instrument at risk of damage to input circuitry. However, if the current mechanical attenuation is below 6 dB it can be increased with the knob and step keys, but not decreased.
Max	EXA: 60 dB MXA: 70 dB
Key Path	**AMPTD, Attenuation**

Enable Elec Atten

You can enable or disable the Electrical Attenuator. The Electrical Attenuator offers no significant advantage over the Mechanical Attenuator for front-panel operation. Therefore it is assumed you will use the Mechanical Attenuator when operating the analyzer from the front-panel.

The electronic attenuator is unavailable above 3.6 GHz. Therefore, if the Stop Frequency of the analyzer is > 3.6 GHz then Enable Elec Atten is grayed out. If the Elec Atten is enabled, then the Stop Freq of the analyzer is limited to 3.6 GHz, which is to say the UI start, stop, center frequency and span values are all limited to a maximum of 3.6 GHz +

Frequency Offset.

SCPI Command	`[:SENSe]:POWer[:RF]:EATTenuation:STATe OFF|ON|0|1` `[:SENSe]:POWer[:RF]:EATTenuation:STATe?`
Example	POW:EATT:STAT ON
Dependencies	The electronic attenuator is unavailable above 3.6 GHz. Therefore, if the Stop Frequency of the analyzer is > 3.6 GHz then the Elec Atten is grayed out. If the Internal Preamp is on, meaning it is set to Low Band or Full, the electronic attenuator is unavailable. In this case the Enable Elec Atten key will be OFF and grayed out. If either of the above are true, if the SCPI command is sent, a generic error indicating that the electronic attenuator is unavailable will be sent. If the Electronic Attenuator is enabled, then the Stop Freq of the analyzer is limited to 3.6 GHz and the Internal Preamp is unavailable.
Preset	OFF
State Saved	Yes
Key Path	AMPTD, Attenuation

When the Electrical Attenuator is enabled, the Mechanical Attenuator transitions to a state in which it has no Auto function. Here are the rules for transitioning the Mechanical Attenuator:

When the Electrical Attenuator is enabled:

- The Mechanical Attenuator is initialized to 10 dB (this is its optimal performance setting). You can then set it as desired with SCPI, numeric keypad, step keys, or RPG, and it behaves as it normally would in manual mode
- The Auto/Man state of Mech Atten is saved
- The Auto/Man line on the Mech Atten softkey disappears and the auto rules are disabled
- The Electrical Attenuator is set to 10 dB less than the previous value of the Mechanical Attenuator, within the limitation that it must stay within the range of 0 to 24 dB of attenuation.

Examples:

- Mech Atten at 20 dB. Elec Atten enabled, Mech Atten set to 10 dB, Elect Atten set to 10 dB. New total attenuation equals value before Elec Atten enabled.
- Mech Atten at 0 dB. Elec Atten enabled, Mech Atten set to 10 dB, Elect Atten set to 0 dB. New total attenuation does not equal value before Elec Atten enabled.
- Mech Atten at 40 dB. Elec Atten enabled, Mech Atten set to 10 dB, Elect Atten set to 24

dB. New total attenuation does not equal value before Elec Atten enabled.

When the Electrical Attenuator is disabled:

- The Elec Atten key is grayed out
- The Auto/Man state of Mech Atten is restored
- If now in Auto, Mech Atten recouples
- If now in Man, Mech Atten sets to the value of total atten that existed before the Elec Atten was disabled. The resulting value should be rounded up to the smallest value possible given the Mech Atten Step setting - (That is, 57 dB would change to 58 dB when Mech Atten Step is 2 dB.)

Elec Atten

You can modify the electrical attenuation using this function

SCPI Command	`[:SENSe]:POWer[:RF]:EATTenuation <rel_ampl>` `[:SENSe]:POWer[:RF]:EATTenuation?`
Restriction and Notes	Electrical Attenuation's spec is defined only when Mechanical Attenuation is 6 dB.
Dependencies	When Enable Elec Atten is off, Elec Atten key is grayed out.
Preset	0 dB
State Saved	Yes
Min	0 dB
Max	24 dB
Key Path	AMPTD, Attenuation

Adjust Atten for Min Clip

This function is similar to the "Optimize Ref Level" function in some measurements. Its purpose is to set the combination of mechanical and electrical attenuation based on the current measured signal level so that clipping will be at a minimum.

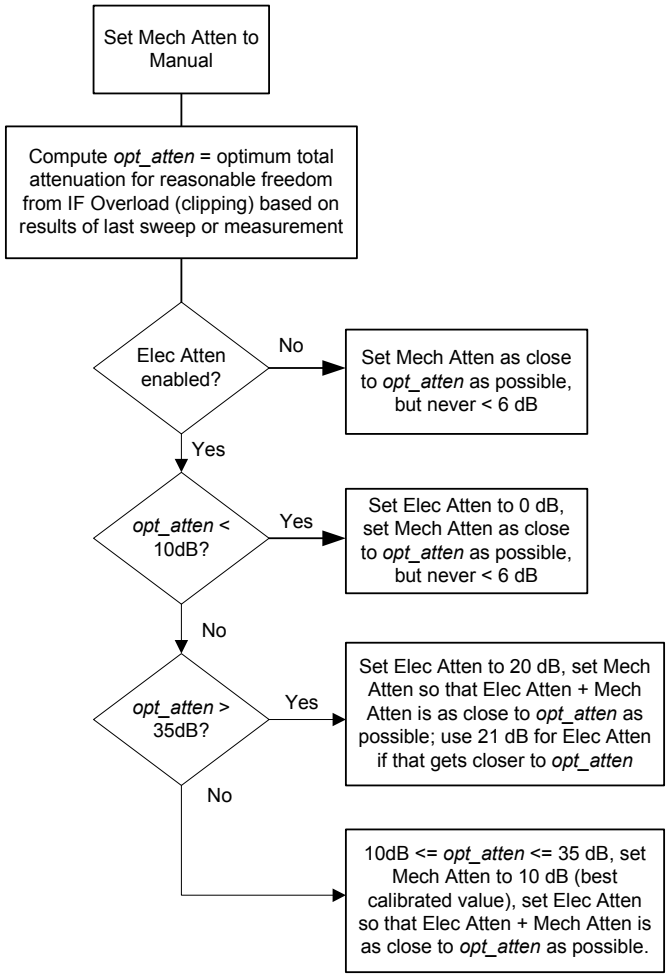
This is a "one-time" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality. The spectrum analyzer measurement, Swept SA, does not support this functionality.

SCPI Command	`[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMediate`

Key Path AMPTD, Attenuation

The algorithm to be used is as follows:



Pre-Adjust for Min Clip

This adjustment executes each time a measurement restarts. Therefore, in Continuous, it only executes before the first measurement.

This key is grayed out in measurements that do not support this functionality. The spectrum analyzer measurement, Swept SA, does not support this functionality.

SCPI Command

```
[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation
OFF|ELECtrical|COMBined

[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?
```

Preset	
State Saved	Saved in State
Key Path	AMPTD, Attenuation

SCPI Command	`[:SENSe]:POWer[:RF]:RANGe:AUTO ON|OFF|1|0`
	`[:SENSe]:POWer[:RF]:RANGe:AUTO?`
Remote Command Notes	ON aliases to “Elec Atten Only”
	OFF aliases to “Off”
	The query returns true if not “Off”

Off

Example	:POW:RANGe:OPT:ATT OFF
Key Path	AMPTD, Attenuation, Pre-Adjust for Min Clip

Elec Atten Only

Example	:POW:RANGe:OPT:ATT ELEC
Key Path	AMPTD, Attenuation, Pre-Adjust for Min Clip

Mech + Elec Atten

Example	:POW:RANGe:OPT:ATT COMB
Key Path	AMPTD, Attenuation, Pre-Adjust for Min Clip

Mech Atten Step

This controls what step size is used when making adjustments to the Input Attenuation.

SCPI Command	`[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement] 10dB | 2dB` `[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement]?`
Example	`POW:ATT:STEP 2`
Dependencies	Blanked in EXA if option FSA (2 dB steps) is not present. Attempts to set it via SCPI will yield the “Option not present” error.
Couplings	When the attenuation step size changes, the current mechanical attenuation value is adjusted (if necessary) to be quantized to the new step size. That is, if step is set to 10 dB, mech atten is increased if necessary so it is a multiple of 10 dB
Remote Command Notes	Note this feature works like a 1-N choice from the front panel, but it takes a specific value (in dB) when used remotely. The only valid values are 2 and 10.
Preset	MXA: 2 dB EXA: 10 dB (2 dB with option FSA)
State Saved	Saved in State
Key Path	AMPTD, Attenuation

Max Mixer Level

The Max Mixer Level controls the limitation on the Ref Level for a given attenuation setting, and therefore also interacts with the Auto rules for selecting the attenuation as a coupling from the reference level.

SCPI Command	`[:SENSe]:POWer[:RF]:MIXer:RANGe[:UPPer] <real>` `[:SENSe]:POWer[:RF]:MIXer:RANGe[:UPPer]?`
Example	POW:MIX:RANG -15 dBm
Preset	-10 dBm
State Saved	Saved in State
Min	-50 dBm
Max	-10 dBm
Key Path	AMPTD, Attenuation
Default Terminator	Depends on the current selected Y axis unit, see Swept SA discussion of Y Axis Unit

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker. If the selected marker is not on when Presel Center is pressed, the analyzer will turn on the selected marker, perform a peak search, then perform centering on the marker's center frequency. If the selected marker is already on, and between the start and stop frequencies of the analyzer, the analyzer performs the preselector calibration on that marker's frequency. If the selected marker is already on, but outside the frequency range between Start Freq and Stop Freq, the analyzer will first perform a peak search, then perform centering on the marker's center frequency.

A number of considerations should be observed to ensure proper operation:

1. If the selected marker is already on, the analyzer will attempt the centering at that marker's frequency.
2. There is no preselector for signals below about 3.6 GHz
3. The preselector can be bypassed (see **Input/Output, Preselector On/Off**). If it is bypassed, no centering will be attempted in that range.

When centering the preselector, *OPC will not return true until the process is complete and a subsequent measurement has completed, nor will results be returned to a READ or MEASure command. Note further that if the box is in a measurement such as averaging when this happens, the act of centering the preselector will restart averaging but the first average trace will not be taken until the centering is completed.

SCPI Command	`[:SENSe]:POWer[:RF]:PCENter`
Example	POW:PCEN
Dependencies	• Grayed out if microwave preselector is off (see **Input/Output, Microwave Preselector On/Off**) • If the selected marker's frequency is below Band 1, advisory 0.5001 is generated and no action is taken. • Grayed out if entirely in Band 0.. • Blank in models that do not include a preselector, such as option 503. If the SCPI is sent in such models, it generates an error.
Couplings	Active marker position determines where the centering will be attempted.
SCPI Notes	Note that the rules outlined above under the key description apply for the remote command as well as the key. Hence, the result of the command is dependent on marker position, etc. Any message shown by the keypress is also shown in response to the remote command.

Key Path	AMPTD
SCPI Status Bits/OPC Dependencies	The Measuring bit should remain set while this command is operating and should not go false until the subsequent sweep/measurement has completed.

Preselector Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when **Presel Center** is available.

For general purpose signal analysis, using Presel Center is recommended. Centering the filter minimizes the impact of long-term preselector drift. Presel Adjust can be used instead to manually optimize the preselector. One application of manual optimization would be to peak the preselector response, which both optimizes the signal-to-noise ratio and minimizes amplitude variations due to small (short-term) preselector drifting.

Preselector Adjust is a Meas Global parameter.

SCPI Command	`[:SENSe]:POWer[:RF]:PADJust <freq>` `[:SENSe]:POWer[:RF]:PADJust?`
Example	POW:PADJ 100KHz POW:PADJ?
Dependencies	• Grayed out if microwave preselector is off (see **Input/Output, Microwave Preselector On/Off**) • Grayed out if entirely in Band 0. • Blank in models that do not include a preselector, such as option 503. If the SCPI is sent in these instruments, it generates an error.
Preset	0 MHz
State Saved	The **Presel Adjust** value set by **Presel Center**, or by manually adjusting **Presel Adjust**, is not saved in Instrument State, and does not survive Preset or power cycle.
Min	-500 MHz
Max	500 MHz
Key Path	AMPTD
Default Terminator	Hz

Internal Preamp

Accesses keys that control the internal preamps. Turning on the preamp gives a better noise figure, but a poorer TOI to noise floor dynamic range. You can optimize this setting for your particular measurement.

Preamp on/off and Preamp Band are Meas Global parameters.

SCPI Command	`[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF|ON|0|1` `[:SENSe]:POWer[:RF]:GAIN[:STATe]?`
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown. The preamp is not available when the electronic attenuator is enabled.
Preset	OFF
State Saved	Saved in state
Key Path	AMPTD

SCPI Command	`[:SENSe]:POWer[:RF]:GAIN:BAND LOW|FULL` `[:SENSe]:POWer[:RF]:GAIN:BAND?`
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown. If a POW:GAIN:BAND FULL command is sent when a low band preamp is available, the preamp band parameter is to LOW instead of FULL, and an "Option not installed" message is generated.
Preset	LOW
State Saved	Saved in state
Key Path	AMPTD, Internal Preamp

Off

Turns the internal preamp off

Example	:POW:GAIN OFF
Key Path	**AMPTD, Internal Preamp**

Low Band

Sets the internal preamp to use only the low band (0-3 GHz)

Example
```
:POW:GAIN ON
:POW:GAIN:BAND LOW
```

Key Path **AMPTD, Internal Preamp**

Full Range

Sets the internal preamp to use its full range. The low band (0-3) GHz is supplied by the low band preamp and the frequencies above 3.6 GHz are supplied by the high band preamp.

The instrument compensates for the preamp gain(s) as it sweeps. For the value of "Int Preamp Gain" in the Ref Level equations, we assume a preamp gain of 20 dB in Low Band Preamp mode and 35 dB in Full Range preamp mode. These gain rules are not dependent on start and stop frequencies. These gains are the maximum gain of the preamp hardware; we will always have the same or less actual gain, providing clipping margin.

The frequency range of the installed (optional) preamp is displayed in square brackets on the key label. If the high band option is not installed the Full Range key does not appear.

Example
```
:POW:GAIN ON
:POW:GAIN:BAND FULL
```

Key Path **AMPTD, Internal Preamp**

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 which have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the **Auto Couple** key is meas local key, so its actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

Example	`:COUP ALL`
Remote Command 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.

BW

Bandwidth features are unique to each Measurement. See the specific Measurement for more information.

The front panel key accesses keys to control measurement bandwidth settings.

Key Path	Front panel key

FREQ/Channel

The Frequency key opens up a menu of softkeys that allow you to control the Frequency parameters of the instrument.

Key Path	**Front panel key**
Help Map ID	5524

ARFCN

Set the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel <integer>`
	`[:SENSe]:CHANnel:ARFCn|RFCHannel?`
Example	:CHAN:ARFC 3
	:CHAN:ARFC?
Dependencies/Couplings	Couple with Center Frequency. Setting ARFCN sets Center Freq to the value corresponding to that ARFCN.
	BMT Freq choise changes this parameter.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.

Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 511 GSM850: 128 to 251
Key Path	**FREQUENCY Channel**
Help Map ID	5510

Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

Mode	GSM
Remote Command	`[:SENSe]:FREQuency:CENTer <freq>` `[:SENSe]:FREQuency:CENTer?`
Example	:FREQ:CENT 1GHz :FREQ:CENT?
Dependencies/Couplings	ARFCN.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	935.200 MHz
State Saved	Saved in instrument state.
Range	See following table
Key Path	**FREQUENCY Channel**
Help Map ID	5511

BMT Freq

Enable quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Mode	GSM
Dependencies/Couplings	Choise changes the ARFCN and Center Freq. Choosed channel number and center frequency will be displayed on each soft key.
State Saved	Saved in instrument state.
Range	Top | Middle | Bottom
Key Path	**FREQUENCY Channel**
Help Map ID	5512

BMT Freq Top

Set the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:TOP`
Example	CHAN:ARFC:TOP

Dependencies/Couplings	Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 511 GSM850: 251 Change B M T ARFCN to BMTFreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz DCS1800: 1879.80 MHz PCS1900: 1989.80 MHz GSM450: 467.400 MHz GSM480: 495.800 MHz GSM700: 761.800 MHz GSM850: 893.800 MHz
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	No
Key Path	**FREQUENCY Channel, BMT Freq**
Help Map ID	5513

BMT Freq Middle

Set the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:MIDDle`

Example	CHAN:ARFC:MIDD
Dependencies/Couplings	Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC1800: 699 PCS1900: 661 GSM450: 276 GSM480: 323 GSM700: 474 GSM850: 189 Change B M T ARFCN to BMTFreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz DCS1800: 1842.60 MHz PCS1900: 1960.00 MHz GSM450: 464.000 MHz GSM480: 492.400 MHz GSM700: 754.600 MHz GSM850: 881.600 MHz
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	No
Key Path	**FREQUENCY Channel, BMT Freq**
Help Map ID	5514

BMT Freq Bottom

Set the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Mode	GSM

Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:BOTTom`
Example	CHAN:ARFC:BOTT
Dependencies/Couplings	Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 Change B M T ARFCN to BMTFreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz DCS1800: 1805.20 MHz PCS1900: 1930.20 MHz GSM450: 460.600 MHz GSM480: 489.000 MHz GSM700: 747.2 MHz GSM850: 869.2 MHz
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	No
Key Path	**FREQUENCY Channel, BMT Freq**
Help Map ID	5515

Timeslot

Select On or Off for slot searching. Generary, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information where is the head of the frame. When Timeslot is set to On,

the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:SLOT <integer>`
	`[:SENSe]:CHANnel:SLOT?`
	`[:SENSe]:CHANnel:SLOT:AUTO OFF|ON|0|1`
	`[:SENSe]:CHANnel:SLOT:AUTO?`
Example	CHAN:SLOT 0
	CHAN:SLOT:AUTO OFF
	CHAN:SLOT:AUTO?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
	OFF
State Saved	Saved in instrument state.
Min	0
Max	7
Key Path	**FREQUENCY Channel**
Help Map ID	5516

Burst Type

Set the burst type that the analyzer will search for and to which it will sync. This only applies with normal burst selected.

KEYNormal (TCH & CCH) SCPINORMal	Burst length = 142 symbols This is the default setting for GSM/EDGE, and should be used for these GSM/EDGE measurements as follows; GMSK Phase & Frequency Error measurement EDGE EVM measurement GMSK/EDGE Power vs. Time measurement

KEYSync (SCH) SCPISYNC	Burst length = 142 symbols Use of this Burst Type is associated with: GMSK Phase & Frequency Error measurement GMSK Power vs. Time measurement Extended training sequences for CTS and COMPACT synchronization bursts would not be supported.
KEYAccess (RACH) SCPIACCess	Burst length = 88 symbols Use of this Burst Type is associated with: GMSK Phase & Frequency Error measurement GMSK Power vs. Time measurement Alternative training (synchronization) sequence "TS1" and "TS2" would be supported only in GSMK Power vs. Time measurement.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:BURSt NORMal|SYNC|ACCess` `[:SENSe]:CHANnel:BURSt?`
Example	CHAN:BURS NORM CHAN:BURS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal (TCH & CCH) | Sync (SCH) | Access (RACH)
Key Path	**FREQUENCY Channel**
Help Map ID	5517

Training Sequence Code (TSC)

Allows you to select the Training Sequence Code that determines which burst is to be measured. This key will be unavailable (grayed out) if a burst type other than Normal is selected, indicating the standard TSC is used corresponding to the burst type. Applicable only when Burst Sync is set to Training Sequence in the measurement.

This parameter appricable only for these measurements below:
GMSK/EDGE Power vs. Time measurement
GMSK Phase & Frequency Error measurement

EDGE EVM measurement

Selection:AutoDet SCPI:ON|1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Selection:Man SCPI:OFF|0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Mode	GSM
Remote Command	`[:SENSe]:CHANnel:TSCode <integer>`
	`[:SENSe]:CHANnel:TSCode?`
	`[:SENSe]:CHANnel:TSCode:AUTO OFF|ON|0|1`
	`[:SENSe]:CHANnel:TSCode:AUTO?`
Example	CHAN:TSC 3
	CHAN:TSC?
	CHAN:TSC:AUTO 1
	CHAN:TSC:AUTO?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
	ON
State Saved	Saved in instrument state.
Min	0
Max	7
Key Path	**FREQUENCY Channel**
Help Map ID	5518

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 softkeys that control the Input/Output parameters of the instrument.

Input choices include the RF input and the Amplitude Reference (50 MHz, 4.8 GHz or 300 MHz comb signal). You can also specify the input impedance for unit conversions.

Other functions related to the input/output connections can be found under **Trig** (trigger input controls) and **System** (LAN and other I/O bus configurations) and **Amplitude** (optional internal preamp).

NOTE	The functions in the Input/Output menu are common to all Modes (applications). They are “global”. But individual functions are only available in a mode if they makes sense. They will be grayed out.

SCPI Command	`[:SENSe]:FEED RF|AREFerence`
	`[:SENSe]:FEED?`
Preset	This setting is unaffected by a Preset or power cycle. It survives 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 state

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 Preset and 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.

Example	`[:SENSe]:FEED RF`
Key Path	Input/Output

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 ohm. Setting the computational input impedance to 75 ohm is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an analyzer with 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.

SCPI 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 Preset but is set to 50 Ω on a “Restore Input/Output Defaults” or “Restore System Defaults->All” Some instruments/options my have 75 Ω available.
State Saved	Saved in State
Key Path	Input/Output, RF

RF Coupling

Specifies alternating current (AC) or direct current (DC) coupling at the analyzer RF input

port. Selecting AC coupling switches in a blocking capacitor that blocks any DC voltage present at the analyzer input. This decreases the input frequency range of the analyzer, but prevents damage to the input circuitry of the analyzer if there is a DC voltage present at the RF input.

In AC coupling mode, you can view signals less than 10 MHz but the amplitude accuracy is not specified. To accurately see a signal of less than 10 MHz, you must switch to DC coupling.

Some amplitude specifications apply only when coupling is set to DC. Refer to the appropriate amplitude specifications and characteristics for your analyzer.

When operating in DC coupled mode, ensure protection of the External Mixer by limiting the DC part of the input level to within 200 mV of 0 Vdc. In AC or DC coupling, limit the input RF power to +30 dBm (1 Watt).

Selecting Input Coupling

N6020A Option	AC Frequency Range	DC Frequency Range
Option 503	10 MHz to 3.6 GHz	3 Hz to 3.6 GHz
Option 507	10 MHz to 7.0 GHz	3 Hz to 7.0 GHz
Option 508	10 MHz to 8.4 GHz	3 Hz to 8.4 GHz
Option 513	10 MHz to 13.6 GHz	3 Hz to 13.6 GHz
Option 526	10 MHz to 26.5 GHz	3 Hz to 26.5 GHz

SCPI Command	`:INPut:COUPling AC|DC` `:INPut:COUPling?`
Example	INP:COUP DC
Preset	AC
State Saved	Saved in State
Key Path	Input/Output, RF

RF Calibrator

Lets you choose a calibrator signal to look at or turns the calibrator “off” (meaning switches back to the selected input). If one of the three calibrator signals (50 MHz, -25 dBm, the 4.8GHz internal amplitude reference or the 300 MHz comb signal) is chosen (as opposed to OFF), the analyzer routes the selected internal amplitude reference as the input signal, while leaving the input selection in the menus (RF, Ext Mix or I/Q) unchanged.

The 50 MHz internal reference and the 300 MHz comb signal are available with all the frequency options. The 4.8GHz internal reference is only available with 507, 508, 513, 526.

This function presets to OFF on a Mode Preset, which causes the internal circuitry to switch back to the selected input (RF, Ext Mix or I/Q).

SCPI Command	`[:SENSe]:FEED:AREFerence REF50|REF4800|COMB|OFF`
	`[:SENSe]:FEED:AREFerence?`
Example	FEED:AREF REF50 selects the 50 MHz amplitude reference as the signal input.
	FEED:AREF REF4800 selects the 4.8GHz amplitude reference as the signal input
	FEED:AREF COMB selects the 300 MHz comb modulated signal as the signal input
	FEED:AREF OFF turns the calibrator "off" (meaning switches back to the selected input – RF, ExtMix or I/Q)
Dependencies	Selecting an input (RF, Ext Mix or I/Q) turns the Calibrator OFF. This is true whether the input is selected by the softkeys or with the [:SENSe]:FEED command.
Preset	OFF
State Saved	Saved in State
Key Path	**Input/Output**

50 MHz

Selects the 50 MHz internal reference as the input signal. This choice is available in all options: 503, 507, 508, 513, 526.

Key Path	**Input/Output, RF Calibrator**

4.8 GHz

Selects the 4.8GHz internal reference as the input signal.

Key Path	**Input/Output, Amptd Ref**

Comb

Selects the 300 MHz comb modulated signal as the input signal. This choice is available in all options: 503, 507, 508, 513, 526.

Key Path **Input/Output, RF Calibrator**

Off

Switches the input back to the selected input (RF, Ext Mix or I/Q)

Key Path **Input/Output, RF Calibrator**

External Gain

Compensates for gain/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/loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of 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 which 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, but 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/loss. In a measurement application mode like GSM or W-CDMA, the gain/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.

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.
Key Path	**Input/Output**

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.)

Please 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/loss.

SCPI 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)
Dependencies	The reference level limits are determined in part by the External Gain/Atten, Max Mixer Level, RF Atten.
	This key is grayed out in many application Modes.
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 State
Min	-81.90 dB
Max	81.90 dB
Key Path	**Input/Output, Ext Gain**

MS

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

SCPI 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.)
Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten
	This key is grayed out in the SA Mode.
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 State
Min	-50 dB
Max	50 dB
Key Path	**Input/Output, Ext Gain**

BTS

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

SCPI 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.)
Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten
	This key is grayed out in the SA Mode.
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 State
Min	-50 dB

Max	50 dB
Key Path	**Input/Output, Ext Gain**

Restore Input/Output Defaults

This selection causes the group of *settings* and *data* associated with **Input/Output** key to be a reset to their default values. 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.

Example	:SYST:DEF INP presets all the Input/Output variables to their factory default values.
Remote Command Notes	Please refer to the Utility Functions section for information about Restore System Defaults and the complete description of the `:SYSTem:DEFault INPut`: command.
Key Path	**Input/Output**

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, EXTMixer 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.

When you make a recording (see **Record Data Now** below) or when you recall a recording (see the Recall section) the data source is automatically set to Recorded Data. You can toggle the data source between Inputs and the current Recording (if there is one). That is, the recording remains in memory until it is replaced by a new recording, or the application is closed.

SCPI Command	`[:SENSe]:FEED:DATA INPut|STORed|RECorded`
	`[:SENSe]:FEED:DATA?`
SCPI Example	FEED:DATA REC
	FEED:DATA?
Dependencies	Not all inputs are available in all modes. Unavailable keys are grayed out.

Remote Command Notes	INPuts = Inputs STORed = Capture Buffer RECorded = Record Data Buffer
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 state
Key Path	Input/Output

Inputs

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

Example	FEED:DATA INP causes the measurement to look at the input selection
Key Path	Input/Output, Data **Source**

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.

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.

Example	FEED:DATA STOR causes stored measurement data to be used with a different measurement that supports this.
Dependencies	Grayed out in the SA measurement.
Key Path	Input/Output, Data **Source**

Recorded Data

Directs the instrument to get data from the record data buffer in the measurement, rather than from the RF Input Signal.

Example	FEED:DATA REC causes the measurement to extract data from the record data buffer
Dependencies	Grayed out in the SA measurement.
Key Path	Input/Output, Data Source

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 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.

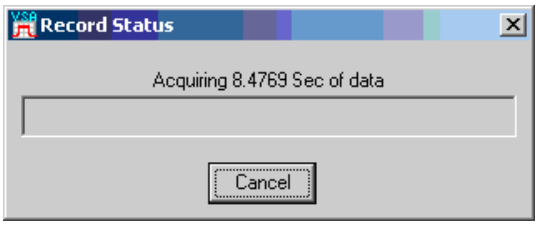
SCPI Command	`[:SENSe]:FEED:DATA:STORe`
Example	FEED:DATA:STOR stores recorded data
Dependencies	Grayed out in the SA measurement.
Remote Command Notes	This is command only, there is no query
Key Path	Input/Output, Data Source

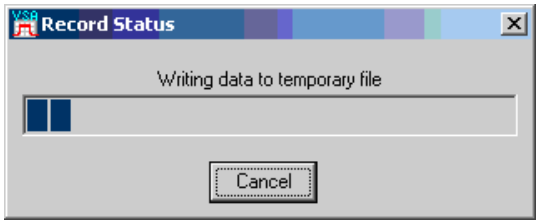
Record Data Now

This causes the data source to change to Inputs (if it is not already set) and a recording is made with the current instrument setup. The length of the recording must be specified in advance. See .

This key changes to **Abort Recording** once the recording process has started. It changes back when the recording is complete.

The following dialogs shows the progress of the recording:





This key is also avialable in the Sweep/Control menu.

SCPI Command	`[:SENSe]:RECording:INITiate[:IMMediate]`
SCPI Example	REC:INIT
Key Path	Input/Output, Data Source
Couplings	Changes Data source to Recorded Data.
Dependencies	Grayed out in the SA measurement.
Remote Command Notes	This is command only, there is no query. See the Recall functionality to access previously saved data.

SCPI Command	`[:SENSe]:RECording:ABORt`
SCPI Example	REC:ABOR
Key Path	Input/Output, Data Source
Remote Command Notes	This is command only, there is no query. The command does nothing if it is sent when there is no recording in progress.

Record Length

This specifies the length of the next recording. (You cannot use this to modify the length of the current recording.) The length defaults to seconds, but you can also specify it in points

at the current sample rate, or in time records at the current time record length.

Mode	VSA
SCPI Command	`[:SENSe]:RECording:LENGth <real>,SEConds|RECords|POINts`
SCPI Command	`[:SENSe]:RECording:LENGth:STATe MAX|MANual` `[:SENSe]:RECording:LENGth:STATe?`
SCPI Example	REC:LENG 20,REC REC:LENG 4.1E-4,SEC REC:LENG:STAT MAX REC:LENG:STAT?
Key Path	Input/Output, Data Source
Default Unit/Terminator	None. The unit must be specified.
Preset/Default	50 Records, Manual
State Saved	No
Min	0
Max	Depends on memory available
Remote Command Notes	The length command does not have a query form. Length information is queried using the following two commands. If set to MAX, all of the available "recording memory" us used.

Mode	VSA
Remote Command	`[:SENSe]:RECording:LENGth:VALue?`
SCPI Example	REC:LENG:VAL?
Preset/Default	50 Records
Remote Command Notes	Query Only Returns the first (numeric) parameter of the most recent [:SENSe]:RECording:LENGth command.

Mode	VSA
Remote Command	`[:SENSe]:RECording:LENGth:UNIT?`
SCPI Example	REC:LENG:UNIT?

Remote Command Notes	Query Only Returns the second parameter of the most recent [:SENSe]:RECording:LENGth command. Possible values are SEC|REC|POIN. If no second parameter was sent, then the return value is SEC.

Freq Ref In

Specifies the frequency reference as being the internal reference, external reference or sensing the presence of an external reference. 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, an error condition detected message is generated. When the external signal becomes valid, the error is cleared.

If Sense is selected, the instrument checks whether a signal is present at the external reference connector and will automatically switch to the external reference when a signal is detected. When no signal is present, it automatically switches to the internal reference. No message is generated as the reference switches between 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 2 in the Questionable Frequency register will be true and an error condition detected message is generated. When lock is regained, Status bit 2 in the Questionable Frequency register will be cleared and an error message is cleared will be sent.

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.

SCPI Command	`[:SENSe]:ROSCillator:SOURce:TYPE INTernal|EXTernal|SENSe` `[:SENSe]:ROSCillator:SOURce:TYPE?`
Preset	This is unaffected by Preset but is set to SENSe on a "Restore Input/Output Defaults" or "Restore System Defaults->All".
State Saved	Saved in State.
Key Path	Input/Output
SCPI Status Bits/OPC Dependencies	STATus:QUEStionable:FREQuency bit 2 set if unlocked.

SCPI Command	`[:SENSe]:ROSCillator:SOURce?`
Remote Command 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 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 EXTernal, then the query returns “EXTernal” 4. If it was set to INTernal, then the query returns INTernal
Preset	SENSe

Sense

The external reference is used if a valid signal is sensed at the Ext Ref input. Otherwise the internal reference is used.

Example	:ROSC:SOUR:TYPE SENS
Key Path	Input/Output, Freq Ref In

Internal

The internal reference is used.

Example	:ROSC:SOUR:TYPE INT
Key Path	Input/Output, Freq Ref In

External

The external reference is used.

Example	:ROSC:SOUR:TYPE EXT
Key Path	Input/Output, Freq Ref In

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 or external reference.)

For the instrument to stay locked, the value entered must be within 5 ppm of the actual ext ref 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.

SCPI 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.
Preset	This is unaffected by Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	EXA: 10 MHz
	MXA: 1 MHz
Max	EXA: 10 MHz
	MXA: 50 MHz
Key Path	Input/Output, Freq Ref In
Default Terminator	Hz

Output Config

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

Trig Out (1 and 2)

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

SCPI Command	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut HSWP|MEASuring|MAIN|GATE|GTRigger|OEVen|OFF`
	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut?`
Example	TRIG:OUTP HSWP
Preset	Trigger 1: Sweeping (HSWP)
	Trigger 2: Gate
	This is unaffected by 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
Key Path	Input/Output, Output Config

Polarity

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

SCPI 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 Preset but is set to POSitive on a “Restore Input/Output Defaults” or “Restore System Defaults->All”
State Saved	Saved in state
Key Path	Input/Output, Output Config, Trig 1 Output

Sweeping (HSWP)

Selects the Sweeping trigger signal to be output to the Trig 1 Out connector. This signal has historically been known as “HSWP” but care should be taken to understand that in this analyzer, its function does not exactly match other products behavior.

Example	TRIG1:OUTP HSWP

Key Path	Input/Output, Output Config, Trig 1 Output

Measuring

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

Example	TRIG1:OUTP MEAS
Key Path	Input/Output, Output Config, Trig 1 Output

Main Trigger

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

Example	TRIG1:OUTP MAIN
Key Path	Input/Output, Output Config, Trig 1 Output

Gate Trigger

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

Example	TRIG1:OUTP GTR
Key Path	Input/Output, Output Config, Trig 1 Output

Gate

Selects the gate signal to be output to the Trig 1 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 represents the time the gate is configured to pass the signal.

Example	TRIG1:OUTP GATE
Key Path	Input/Output, Output Config, Trig 1 Output

Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 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.

Example	TRIG1:OUTP OEV
Key Path	Input/Output, Output Config, Trig 1 Output

Off

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

Example	TRIG1:OUTP OFF
Key Path	Input/Output, Output Config, Trig 1 Output

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.

SCPI Command	`:FORMat[:TRACe][:DATA] ASCii|REAL,32 |REAL,64` `:FORMat[:TRACe][:DATA]?`
Remote Command Notes	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 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 mdBm (.001 dBm).
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.
Preset	ASCii

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.

SCPI Command	`:FORMat:BORDer NORMal|SWAPped`
	`:FORMat:BORDer?`
Preset	NORMal

Source

This mode does not have any Source control functionality.

Key Path	Front panel key

SPAN
X Scale

Span features are unique to each Measurement. See the specific Measurement for more information.

The front panel key accesses keys to control span (or X-axis) settings.

Key Path	Front panel key

Trace / Detector

Trace/Detector features are unique to each Measurement. See the specific Measurement for more information.

The front panel key accesses keys to control Trace and Detector settings.

Key Path	Front panel key

View/Display

The View/Display key opens up the View menu for the current measurement. This menu includes the **Display** key for controlling items on the display. The Display functions are common across multiple Modes and Measurements and are described in this section. See each measurement description for information on data views that are unique to that Measurement.

Views are different ways of looking at data, usually different ways of looking at the same data, especially when the data represents a time record that is being digitally processed with an FFT and/or other digital signal processing algorithms. In some modes, like the Spectrum Analyzer mode, we are mostly concerned with swept spectrum analysis, and those views may represent different ways of looking at the same signal.

Key Path	**Front-panel key**

Display

This is a menu common to all measurements for configuring items on the display. Keys not relevant to a given measurement should be grayed out. Keys not relevant to any measurement in a mode should be blanked. The Display menu settings are specific to the measurement selected under the **Meas** key, except for those settings under the **System Display Settings** key.

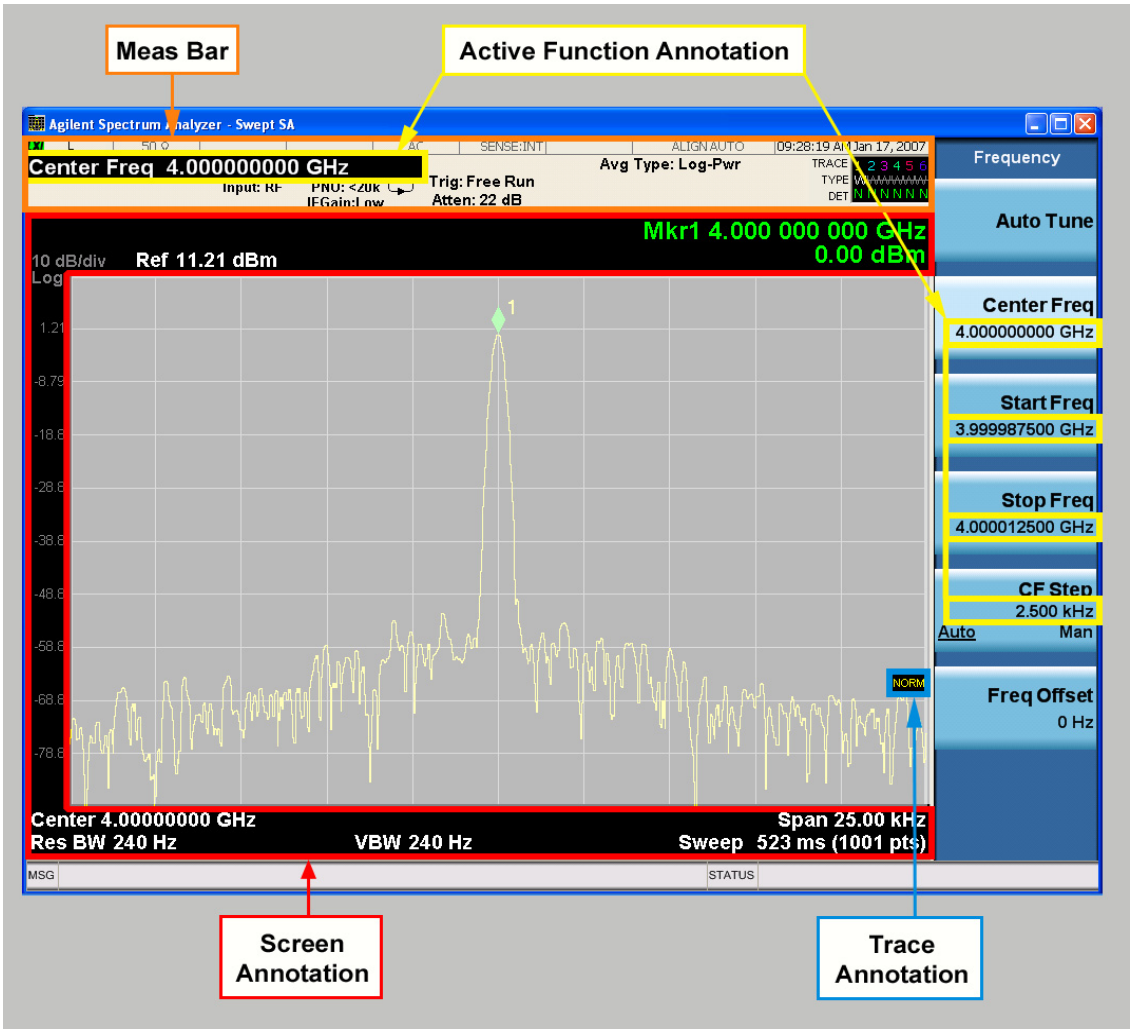
Key Path	View/Display

Annotation

Turns on/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. 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 figure below. Each type of annotation can be turned on and off individually.



Key Path View/Display, Display

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.

SCPI 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 Display Settings, Annotation** is set to Off.
State Saved	Saved in instrument state.
Key Path	View/Display, Display, Annotation

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.

SCPI 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 Display Settings, Annotation** is set to Off
State Saved	Saved in instrument state.
Key Path	View/Display, Display, Annotation

Trace

Turns on and off the labels on the traces, showing their detector (or their math mode) as described in the Trace/Detector section.

If trace math is being performed with a trace, then the trace math annotation will replace the detector annotation.

SCPI Command	`:DISPlay:ANNotation:TRACe[:STATe] ON|OFF|1|0` `:DISPlay:ANNotation:TRACe[:STATe]?`
Example	DISP:ANN:TRAC OFF

Preset	Off
State Saved	Saved in instrument state.

Active Function Values On/Off

Turns on/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.

SCPI 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 Display Settings, Annotation** is set to Off
State Saved	Saved in instrument state.
Key Path	View/Display, Display, Annotation

Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display

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**.

Mode	All
Example	DISP:<your_measurement>:ANN:TITL:DATA “This Is My Title”
State Saved	Saved in instrument state.
Key Path	View/Display, Display, Title

Mode	SA, with Swept SA Measurement active
SCPI Command	`:DISPlay:ANNotation:TITLe:DATA <string>`
	`:DISPlay:ANNotation:TITLe:DATA?`
Example	DISP:ANN:TITL:DATA “This Is My Title”
	Sets the title to: This Is My Title
	This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Key Path	View/Display, Display, Title

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.

Example	DISP:ANN:TITL:DATA “” clears any existing title characters.
Remote Command Notes	Use the :DISPlay:ANNotation:TITLe:DATA <string> command with an empty string.
Preset	Performed on Preset.
Key Path	View/Display, Display, Title

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis

annotation on and off.

SCPI 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
Preset	On
State Saved	saved in instrument state
Key Path	View/Display, Display

Display Line

Activates an adjustable horizontal line that is used as a visual reference line. The line's vertical position corresponds to its amplitude value. The value of the display line (for example, "-20.3 dBm") appears above the line itself on the right side of the display in the appropriate font.

The display line can be adjusted using the step keys, knob, or numeric keypad. The unit of the Display Line is determined by the **Y axis unit** setting under **Amplitude**. If more than one window has a display line, the display line of the selected window is controlled.

If the display line is off the screen, it shows as a line at the top/bottom of the screen with an arrow pointing up or down. As with all such lines (Pk Thresh, Trigger Level, etc.) it is drawn on top of all traces.

The display line is unaffected by Auto Couple.

SCPI Command	`:DISPlay:WINDow[1]:TRACe:Y:DLINe <ampl>`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe?`
BAF SCPI Command	`:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe OFF|ON|0|1`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe?`
Example	DISP:WIND:TRAC:Y:DLIN:STAT ON
	DISP:WIND:TRAC:Y:DLIN:STAT -32 dBm
Preset	Set the Display Line to Off and -25 dBm on Preset. When the Display Line goes from Off to On, if it is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was.
	The Display Line's value does not change when it is turned off.
State Saved	Saved in instrument state.
Min	– ∞ (minus infinity) in current units

Max	+ ∞ (plus infinity) in current units
Key Path	View/Display, Display
Default Terminator	Depends on the current selected Y axis unit

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, **System Display Settings**

Annotation On/Off

This is a Mode Global override of the meas local annotation settings. When it is OFF, it forces Screen Annotation, 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 OFF, **Screen, Meas Bar, Trace** and **Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to OFF. When it is ON, it allows the local annotation settings to be set on a measurement by measurement basis.

To implement this feature properly will require overriding but not changing the local settings for the current measurement. If the measurement changes, the settings for the new measurement must likewise be overridden but not changed. Then if this function turns off, the settings will be returned to their local values.

SCPI Command	`:DISPlay:WINDow[1]:ANNotation[:ALL] OFF|ON|0|1` `:DISPlay:WINDow[1]:ANNotation[:ALL]?`
Example	:DISP:WIND:ANN OFF
Setup	`:SYSTem:DEFault MISC`
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Key Path	View/Display, Display, **System Display Settings**, Annotation

Theme

This key allows you to change the Display theme. This is similar to the **Themes** selection

under **Page Setup** and **Save Screen Image**. The four themes are detailed below.

SCPI Command	`:DISPlay:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:DISPlay:THEMe?`
Setup	`:SYSTem:DEFault MISC`
Preset	TDColor (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Key Path	View/Display, Display, **System Display Settings**
Remote Command Notes	TDColor – 3D is the standard color theme with filling and shading TDMonochrome – is similar to 3D color, but only black is used FCOLor – flat color is intended for inkjet printers to conserve ink. It uses a white background instead of black. FMONochrome – is like flat color, but only black is used
Example	`DISP:THEM TDM` sets the display theme to 3D Monochrome.

Backlight

Accesses the display backlight on/off keys. This setting may interact with settings under the Windows “Power” menu.

When the backlight is off, pressing ESC, TAB, SPACE, ENTER, UP, DOWN, LEFT, RIGHT, DEL, BKSP, CTRL, or ALT turns the backlight on without affecting the application. Pressing any other key will turn backlight on and could potentially perform the action as well.

SCPI Command	`:DISPlay:BACKlight ON|OFF` `:DISPlay:BACKlight?`
Setup	`:SYSTem:DEFault MISC`
Preset	ON (Set by Restore Misc Defaults)
Key Path	**View/Display**, **Display**, **System Display Settings**

On

Turns the display backlight on.

Example	DISP:BACK ON
Key Path	**View/Display**, **Display**, **System Display Settings**, **Backlight**

Off

Turns the display backlight off.

Example	DISP:BACK OFF
Key Path	**View/Display**, **Display**, **System Display Settings**, **Backlight**

Backlight Intensity

An active function used to set the backlight intensity. It goes from 0 to 100 where 100 is full on and 0 is off. This value is independent of the values set under the Backlight on/off key.

SCPI Command	`:DISPlay:BACKlight:INTensity <integer>`
	`:DISPlay:BACKlight:INTensity?`
Example	DISP:BACK:INT 50
Setup	`:SYSTem:DEFault MISC`
Preset	100 (Set by Restore Misc Defaults)
Min	0
Max	100
Key Path	View/Display, Display, **System Display Settings**

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.

SCPI Command	`:DISPlay:FSCReen[:STATe] OFF|ON|0|1`
	`:DISPlay:FSCReen[:STATe]?`
State Saved	Not saved in state.
Key Path	Display

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.

SCPI 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.

4 Marker Functions

Marker

Some Marker operation is 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 Marker key accesses the Marker menu. A marker can be placed on a trace to allow the value of the trace at the marker point to be determined precisely. The functions in this menu include a 1-of-N selection of the control mode Normal, Delta, Fixed, or Off for the selected marker. 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.

Markers may also be used in pairs to read the difference (or delta) between two data points. They can be used in Marker Functions to do advanced data processing, or to specify operating points in functions like Signal Track and N dB Points.

Key Path	Front panel key

Marker Function

Some Marker Functions 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 Marker Function key opens up a menu of keys that allow you to control the Marker Functions of the instrument. Marker Functions perform post-processing operations on marker data. Band Functions are Marker Functions that allow you to define a band of frequencies around the marker. The band defines the region of data used for the numerical calculations. These marker functions also allow you to perform mathematical calculations on trace and marker data and report the results of these calculations in place of the normal marker result.

NOTE Unlike regular markers, marker function markers are not placed directly on the trace. They are placed at a location which is relative to the result of the function calculation.

Key Path Front panel key

Marker To

Some Marker operation is 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.

Key Path	Front panel key

Peak Search

Pressing the Peak Search key displays the Peak Search menu and places the selected marker on the trace point with the maximum y-axis value for that marker's trace. The Peak Search features allow you to define specific search criteria to determine which signals can be considered peaks, excluding unwanted signals from the search.

If **Same as "Next Peak" Criteria** is selected, and either **Pk Excursion** or **Pk Threshold** are on, a signal must meet those criteria. If no valid peak is found, a message is generated and the marker is not moved. When **Highest Peak** is on, or both **Pk Excursion** and **Pk Threshold** are off, the marker is always placed at the point on the trace with the maximum y-axis value, even if that point is on the very edge of the trace (exception: negative frequencies and signals close to the LO are not searched at all).

Pressing Peak Search with the selected marker off causes the selected marker to be set to **Normal** at the center of the screen, then a peak search is immediately performed.

Key Path	Front panel key

5 Measurement Functions

Some of the content described in this section is not directly applicable to the GSM/EDGE Mode. This is common analyzer functionality information that can be used as reference material. It provides additional information about some of the unique features that are available in the measurements in this mode.

Meas

The information in this section is common to all measurements. For key and remote command information on each measurement, refer to the section which 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	You cannot get help for a measurement by pressing one of the measurement softkeys. One way to get help for a measurement is through the Help table of contents, which contains a book for each measurement. To see help for a measurement, click its book in the table of contents. For example, click the "ACP Measurement" book in the table of contents to display help for the ACP measurement.

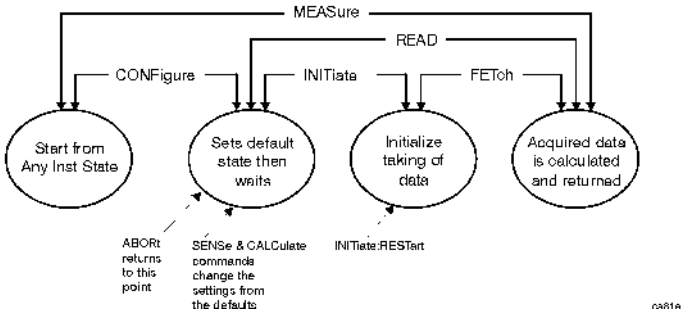
NOTE	Operation for some keys differ between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path Front-panel key

Command Interactions: MEASure, CONFigure, FETCh, INITiate and READ

Each one-button measurement has a group of commands that work together to make the measurement fast, but flexible.

Figure 5-1 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:NDEFault<measurement> 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.

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 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 then 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 then the ASCII format. (FORMat:DATA)

Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

Remote Command	`:CONFigure?`
Example	CONF?

Test current results against all limits (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.

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.

Calculate/Compress Trace Data Query

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.

Parameter Name	Calculate/Compress Trace/Data Query
SCPI Command	`:CALCulate:DATA<n>:COMPress? BLOCk|CFIT|MAXimum|MINimum|MEAN|DMEan|RMS|SAMPle|SDEViation|PPHase [,<soffset>[,<length>[,<roffset>[,<rlimit>]]]]`
SCPI 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.
Example	To query the mean power of a set of GSM bursts: 1. Supply a signal that is a set of GSM bursts. 2. Select the IQ Waveform measurement (in IQ Analyzer Mode). 3. Set the sweep time to acquire at least one burst. 4. Set the triggers such that acquisition happens at a known position relative to a burst. 5. 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.)

- 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, 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 (x,y pair) 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 (x,y pair) 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 5-1 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 5-2 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:

Figure 5-2 DMEan Value of Data Points for Specified Region(s)

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

- *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.

  For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation.

Note: 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 5-3 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 5-4 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 5-5 Standard Deviation of Data Point Values for Specified Region(s)

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

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).

Equation 5-6 Standard Deviation of I/Q Data Pair Values for Specified Region(s)

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

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) $= \sqrt{\frac{1}{n} \sum_{Xi \in \text{region}} XiXi^*}$

  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:

  $$\text{Phase} = \frac{1}{n} \sum_{Yi \in \text{region}} Yi$$

  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.

Figure 5-3 Sample Trace Data - Constant Envelope

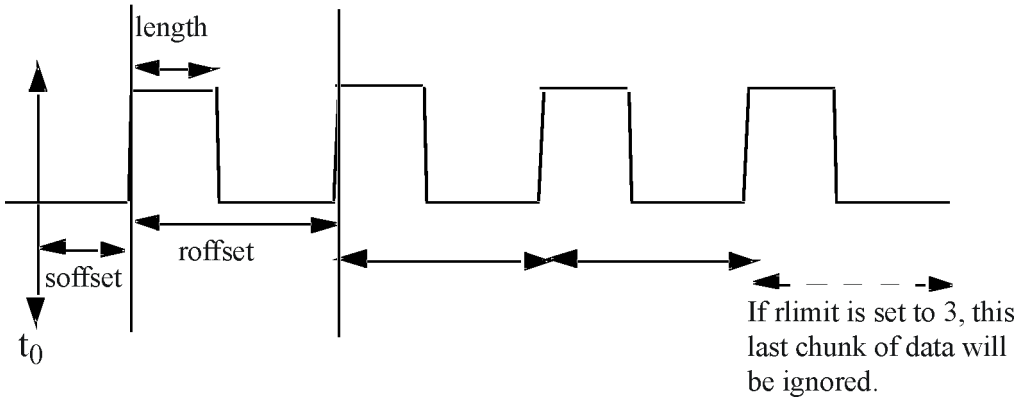
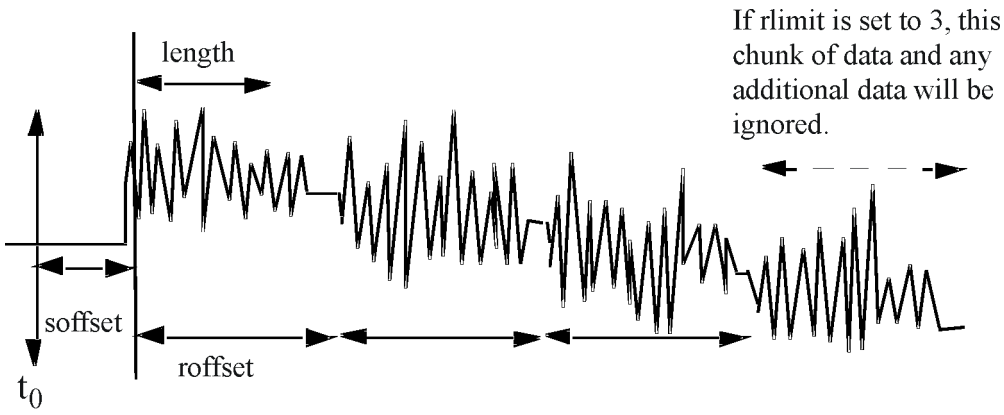


Figure 5-4 Sample Trace Data - Not Constant Envelope



<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

```
:CALCulate:DATA[1]|2|3|4|5|6:PEAKs?
<real>,<real>[,AMPLitude|FREQuency|TIME[,ALL|GTDLine|LTD
Line]]
```

Remote Command

For Swept SA measurement:

```
:CALCulate:DATA[1]|2|3|4|5|6:PEAKs?
<threshold>,<excursion>[,AMPLitude|FREQuency|TIME[,ALL|G
TDLine|LTDLine]]
```

For most other measurements:

```
:CALCulate:DATA[1]|2|3|4|5|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 the its corresponding frequency (or time).

If no peaks are found the peak list will consist of only the number of peaks, (0).

Dependencies/Couplings

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported.

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 0.0dB. 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.

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

Meas Setup

Meas Control features are unique to each Measurement. See the specific Measurement for more information.

Key Path	Front panel key

Mode

The Mode key allows you to select the available measurement applications. The application software must be loaded and license for it to be available. Measurement applications are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each mode software product is ordered separately by Model Number. The default measurement mode is the first listing in the menu.

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.

A list of the valid mode choices is returned with the INST:CAT? Query. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

Key Path	Mode
SCPI Command	`:INSTrument[:SELect] SA|BASIC|ADEMOD|NFIGURE|PNOISE|CDMA2K|TDSCDMA|VSA|VSA89601|WCDMA|WIMAXOFDMA` `:INSTrument[:SELect]?`
Example	:INST SA
Remote Command 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. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.
Preset	Not affected by Preset. Set to SA following Restore System Defaults, if SA is the default mode.
State Saved	Saved in state

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.

Mode	:INSTrument:NSELect <integer>	:INSTrument[:SELect] <parameter>
Analog Demod	234	ADEMOD

cdma2000	10	CDMA2K
GSM & EDGE	13	EDGEGSM
I/Q Analyzer (Basic)	8	BASIC
Noise Figure	219	NFIGURE
Phase Noise	14	PNOISE
Spectrum Analyzer	1	SA
TD-SCDMA	211	TDSCDMA
Vector Signal Analyzer	100	VSA
89601 VSA	101	VSA89601
WCDMA with HSDPA/HSUPA	9	WCDMA
802.16 OFDMA (WiMAX/WiBro)	75	WIMAXOFDMA

SCPI Command	`:INSTrument:NSELect <integer>` `:INSTrument:NSELect?`
Example	:INST:NSEL 1
Preset	Not affected by Preset. Set to default mode (1 for SA mode) following Restore System Defaults.
State Saved	Saved in state

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.

SCPI Command	`:INSTrument:CATalog?`
Example	:INST:CAT?
Remote Command Notes	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA”

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

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

SCPI Command	`:SYSTem:APPLication[:CURRent][:NAME]?`
Example	:SYST:APPL?
Remote Command Notes	Query returns a quoted string which 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 Save is done.

Current Application Revision

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

SCPI Command	`:SYSTem:APPLication[:CURRent]:REVision?`
Example	:SYST:APPL:REV?
Remote Command Notes	Query returns a quoted string which 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 Preset
State Saved	Not saved in state, the value will be the selected application when Save is done.

Current Application Options

Returns a string which is the Options list of the currently selected application (mode).

SCPI Command	`:SYSTem:APPLication[:CURRent]:OPTion?`
Remote Command Notes	Query returns a quoted string which 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 Preset
State Saved	Not saved in state per se, value will be the selected application when Save is invoked
Example	:SYST:APPL:OPT?

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

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

SCPI Command	`:SYSTem:APPLication:CATalog[:NAME]:COUNt?`
Example	:SYST:APPL:CAT:COUN?
Preset	Not affected by Preset
State Saved	Not saved in state.

Application Catalog Model Numbers

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

SCPI Command	`:SYSTem:APPLication:CATalog[:NAME]?`

Example	:SYST:APPL:CAT?
Remote Command 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”
Preset	Not affected by Preset
State Saved	Not saved in state.

Application Catalog Revision

Returns the Revision of the provided Model Number.

SCPI Command	`:SYSTem:APPLication:CATalog:REVision? <model>`
Example	:SYST:APPL:CAT:REV? ‘N9060A’
Remote Command 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 Preset
State Saved	Not saved in state.

Application Catalog Options

Returns a list of Options for the provided Model Number

SCPI Command	`:SYSTem:APPLication:CATalog:OPTion? <model>`
Example	:SYST:APPL:CAT:OPT? ‘N9060A’
Remote Command 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 Preset

State Saved	Not saved in state.

Spectrum Analyzer

Selects the Spectrum Analyzer mode for general purpose measurements. There are several measurements available in this mode. General spectrum analysis measurements, in swept and zero span, can be done using the first key in the **Meas** menu, labeled **Swept SA**. Other measurements in the **Meas** Menu are designed to perform specialized measurement tasks, including power and demod measurements.

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 SA
	INST:NSEL 1

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

Phase Noise

The Noise Figure mode makes a number of individual noise figure measurements over the range of frequencies specified by the frequency parameters. After each frequency point has been measured, the results are displayed on screen.

The following result types are available:

- **Noise Figure** – of an active device, over the bandwidth of interest, the contribution by the device itself to thermal noise at its output. The noise figure is usually expressed in decibels (dB), and is with respect to thermal noise power at the system impedance, at a standard noise temperature (usually 290 K) over the bandwidth of interest. It is determined by:

  a. measuring (determining) the ratio, usually expressed in dB, of the thermal noise power at the output, to that at the input and
  b. subtracting from that result, the gain in dB, of the system.

  Typical noise figures range from 0.5 dB for very low noise devices, to 4 to 8 dB. In some systems, for example heterodyne systems, total output noise power includes noise from other than thermal sources, such as spurious contributions from image-frequency transformation. But noise from these sources is not considered in determining the noise figure. In this example, the noise figure is determined only with respect to that noise that appears in the output via the principal frequency transformation of the system. It excludes noise that appears via the image frequency transformation, which is Synonym noise factor.

- **Noise Factor** - is Noise Figure expressed using Linear units rather than dB.

- **Gain** – is the amplification factor, also called gain, is the extent to which an analog amplifier boosts the strength of a signal. Amplification factors are usually expressed in terms of power.

  The decibel (dB), a logarithmic unit, is the most common way of quantifying the gain of an amplifier. For power, doubling the signal strength (an output-to-input power ratio of 2:1) translates into a gain of 3 dB; a tenfold increase in power (output-to-input ratio of 10:1) equals a gain of 10 dB; a hundredfold increase in power (output-to-input ratio of 100:1) represents 20 dB gain. If the output power is less than the input power, the amplification factor in decibels is negative. If the output-to-input signal power ratio is 1:1, then the amplification factor is 0 dB.

  Power amplifiers typically have gain figures from a few decibels up to about 20 dB. Sensitive amplifiers used in wireless communications equipment can show gain of up to about 30 dB. If higher gain is needed, amplifiers can be cascaded, that is, hooked up one after another. But there is a limit to the amplification that can be attained this way. When amplifiers are cascaded, the later circuits receive noise at their inputs along with the signals. This noise can cause distortion. Also, if the amplification factor is too high, the slightest feedback can trigger oscillation, rendering an amplifier system inoperative.

- **Y-Factor** – is a ratio of two noise power levels, one measured with the noise source ON, and the other with the noise source OFF, that is $Y=N^{ON}/N^{OFF}$. Because noise power is proportional to noise temperature, it can be stated that $Y=T^{ON}/T^{OFF}$. The Y-factor measurement is the most common method of measuring the quantities required to calculate the noise figure and gain results.

- **Effective Temperature** – All types of random noise can be expressed as the equivalent amount of thermal noise that would be generated at a physical temperature T_e. Generally the word effective (or equivalent) is taken as understood, and the normal term is simply ‘noise temperature’.

- **Hot/Cold Power Density** – The level of the noise floor observed on a spectrum analyzer depends, in part, on the selected bandwidth of the measurement. The wider the bandwidth, the more noise is measured for each data point. If the instrument can display noise density, it simply normalizes the power measurements to a 1 Hz bandwidth and references it to kTB –173.88 dBm/Hz; the displayed function is equivalent to power spectral density referenced to kTB i.e. 15 dB would mean the power spectral density = -158.88 dBm/Hz.

  Hot Power Density simply refers to the power density measured when the noise source is turned on, and Cold Power Density is the same thing but with the noise source turned off.

The calculation of these results is described in detail in the Agilent Application Note 57-2, literature number 5952-3706E.

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 PNOISE or INST:NSEL 14

Noise Figure

The Noise Figure mode provides pre-configured measurements for making general purpose measurements of device noise figure.

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 NFIGURE Or INST:NSEL 219

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

W-CDMA with HSDPA/HSUPA

Selects the W-CDMA with HSDPA/HSUPA 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

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

GSM with EDGE

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

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

TD-SCDMA

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

Vector Signal Analyzer

The 89601X Vector Signal Analyzer (VSA) provides vector-signal analysis measurement capability. It provides 3 main measurements that allow you to measure the signal quality of all varieties of RF modulation:

- Digital Demodulation
- Analog Demodulation

- Vector Signal Analysis

There are advanced modulation analysis and troubleshooting capabilities including the following communications formats: AM, FM, PM, WiMAX, W-CDMA, 2G, 3G, 3.5G, WLAN, digital video, and more. It also provides standard-specific measurements for analysis of iDEN, WiDEN, and MotoTalk signals with Option H09.

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

Mode Setup

Mode Setup opens a menu of keys that allows you to specify parameters of the mode.

Key Path	**Front-panel key**

Radio

Accesses Radio setup menu.

Key Path	**Front-panel key**

Band

Selects the standard variant that applies to the radio to be tested.

KEY:P-GSM SCPI:PGSM	Primary GSM in the 900 MHz band
KEY:E-GSM SCPI:EGSM	Extended GSM in the 900 MHz band
KEY:R-GSM SCPI:RGSM	Railway GSM in the 900 MHz band
KEY:DCS 1800 SCPI:DCS1800	DSC1800 band; also known as GSM–1800
KEY:PCS 1900 SCPI:PCS1900	PCS1900 band; also known as GSM–1900
KEY:GSM 450 SCPI:GSM450	GSM450 band
KEY:GSM 480 SCPI:GSM480	GSM480 band
KEY:GSM 700 SCPI:GSM700	GSM700 band
KEY:GSM 850 SCPI:GSM850	GSM850 band, for IS–136HS

Mode	GSM
Remote Command	`[:SENSe]:RADio:STANdard:BAND PGSM|EGSM|RGSM|DCS1800|PCS1900|GSM450|GSM480|GSM700|GSM850`
	`[:SENSe]:RADio:STANdard:BAND?`
Example	:RAD:STAN:BAND PGSM
	:RAD:STAN:BAND?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	PGSM
State Saved	Saved in instrument state.
Range	P-GSM | E-GSM | R-GSM | DCS 1800 | PCS 1900 | GSM 450 | GSM 480 | GSM 700 | GSM 850
Key Path	**Mode Setup, Radio**

Device

Selects the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Mode	GSM
Remote Command	`[:SENSe]:RADio:DEVice BTS|MS`
	`[:SENSe]:RADio:DEVice?`
Example	RAD:DEV BTS
	RAD:DEV?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BTS
State Saved	Saved in instrument state.
Range	BTS | MS
Key Path	**Mode Setup, Radio**

BTS Type

Select the type of base station to be tested.

KEY:Normal SCPI:NORMal	Normal BTS.
KEY:Micro1 SCPI:MICR1|MICRo	Micro 1 BTS. Note: SCPI enumeration 'MICRo' is kept for backward compatibility. It is equivalent to 'MICR1'.
KEY:Micro2 SCPI:MICR2	Micro 2 BTS.
KEY:Micro3 SCPI:MICR3	Micro 3 BTS.
KEY:Pico1 SCPI:PICO1|PICO	Pico 1 BTS. Note: SCPI enumeration 'PICO' is kept for backward compatibility. IT's equivalent to 'PICO1'.

Mode	GSM
Remote Command	`[:SENSe]:RADio:DEVice:BASE[:TYPE] NORMal|MICRo|MICR1|MICR2|MICR3|PICO|PICO1` `[:SENSe]:RADio:DEVice:BASE[:TYPE]?`
Example	:RAD:DEV:BASE PICO1 :RAD:DEV:BASE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. PICO is an alias of PICO1.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Micro1|Micro2|Micro3|Pico1
Key Path	**Mode Setup, Radio**

Freq Hopping

Turns the carrier hoping mode on and off. Measurement would be wait for the varid burst hop into the channel frequency.

This parameter appricable only for these measurements below:
GMSK/EDGE Transmit Power measurement
GMSK/EDGE Power vs. Time measurement
GMSK/EDGE Output RF Spectrum measurement
GMSK Phase & Frequency Error measurement
EDGE EVM measurement

Mode	GSM
Remote Command	`[:SENSe]:RADio:CARRier:HOP OFF|ON|0|1`
	`[:SENSe]:RADio:CARRier:HOP?`
Example	:RAD:CARR:HOP ON
	:RAD:CARR:HOP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Mode Setup, Radio**

Carrier

Select the type of RF carrier on the device to be tested. You need to select 'Cont' if the all 8 slots active in frame and the carrier has no gap between the slots.

KEY:Burst SCPI:BURSt	For single or multi slotted burst carrier signal.
KEY:Cont SCPI:CONTinuous	For continuous multi slot carrier signal.

This parameter appricable only for these measurements below:
GMSK/EDGE Power vs. Time measurement
GMSK Phase & Frequency Error measurement
EDGE EVM measurement

GMSK/EDGE Power vs. Time measurement does not support full continuous multi-slot signal (no gap between two adjacent slots).

EDGE EVM will skip burst search for Multi-Slot signal.

Mode	GSM
Remote Command	`[:SENSe]:RADio:CARRier[:TYPE] BURSt|CONTinuous`
	`[:SENSe]:RADio:CARRier[:TYPE] ?`
Example	:RAD:CARR BURS
	:RAD:CARR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BURSt
State Saved	Saved in instrument state.
Range	Burst|Cont
Key Path	**Mode Setup, Radio**

Power Control Level (PCL)

Allows user to choose the power control level (PCL) of the transmitter.

Selection:AutoRange SCPI:ON|1	PCL would be determined by the measured carrier power level, and the PCL would be used to determine the test limits. Since PCL is integer number, the value would be determined by the nearest Target Carrier Power level. For example, if the measured carrier power level is +35.9 dBm in a GSM 400 system, nearest Target Carrier Power is 35 dBm, so the PCL would be set to 4. If measured carrier power level is just the center between Target Carrier Power like 34.0 dBm, PCL would be determined by the higher Target Carrier Power (this case, 35 dBm, PCL:4).
Selection:Man SCPI:OFF|0	User defined PCL would be used to determine the test limits.

This parameter appricable only for these measurements below:
GMSK/EDGE Power vs. Time measurement

GMSK/EDGE Output RF Spectrum measurement

This parameter is applicable only when selected Device is MS.

Target Carrier Power [dBm]	Power Control Level
39	2
37	3
35	4
33	5
31	6
29	7
27	8
25	9
23	10
21	11
19	12
17	13
15	14
13	15
11	16
9	17
7	18
5	19

Table 2-1: Power Control Level for GSM 400, GSM 900, GSM 850 and GSM 700

Target Carrier Power [dBm]	Power Control Level
36	29
34	30
32	31
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

Table 2-2: Power Control Level for DCS 1800

Target Carrier Power [dBm]	Power Control Level
33	30
32	31
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

Table 2-3: Power Control Level for PCS 1900

Backward Compatibility SCPI	[:SENSe]:EPVTime:PCLevel [:SENSe]:PVTime:PCLevel
Mode	GSM

Remote Command	`[:SENSe]:RADio:PCLevel <integer>`
	`[:SENSe]:RADio:PCLevel?`
	`[:SENSe]:RADio:PCLevel:AUTO 0|1|OFF|ON`
	`[:SENSe]:RADio:PCLevel:AUTO?`

Example	:RAD:PCL 3 :RAD:PCL? :RAD:PCL:AUTO ON :RAD:PCL:AUTO?

Restriction and Notes	Applicable only for Power vs. Time and Output RF Spectrum measurements. Grayout unless selected Device is MS.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 ON
State Saved	Saved in instrument state.
Min	0
Max	40
Key Path	**Mode Setup, Demod**

Demod

Accesses Demod setup menu.

Key Path	**Front-panel key**

Burst Align

Select the sync alignment to be ether to the GSM standard or the standard offset by 1/2 bit behind.

KEYGSM SCPIGSM	Uses the burst alignment as defined in the GSM specifications.
KEY1/2 Bit Offset SCPIHBIT	Shifts the burst alignment by 1/2 bit, which correnponds to an earlier interpretation of the GSM standard. This selection applies to the Power vs. Time and the Phase and Frequency Error measurements.
Mode	GSM

Remote Command	`[:SENSe]:SYNC:ALIGnment GSM|HBIT`
	`[:SENSe]:SYNC:ALIGnment?`
Example	:SYNC:ALIG HBIT
	:SYNC:ALIG?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GSM
State Saved	Saved in instrument state.
Range	GSM | 1/2 Bit Offset
Key Path	**Mode Setup, Demod**

Carrier Bandpass Filter

Customers want to measure each carrier EVM under multiple carriers exist. When the power of alternate carrier is higher than the target carrier or it has interference with the target, it getting worse the measurement result of EVM, even worse can't sync to the input signal and do EVM measurement. This parameter applys band-limited filter to reduce carrier leakage from adjacent band. If obviously measuring a single carrier, this filter is better to turn off to get better measurement value. GSM requires spacing to be at least 600kHz. So channel spacing is 600kHz and tolerant level is +5dB.

KEY:On	Enable multi carrier tolerance filter.
SCPI:MULTiple	
KEY:Off	Disable multi carrier tolerance filter.
SCPI:SINGle	

This parameter appricable only for these measurements below:
GMSK Phase & Frequency Error measurement
EDGE EVM measurement

Mode	GSM
Remote Command	`[:SENSe]:RADio:CARRier:NUMBer SINGle|MULTiple`
	`[:SENSe]:RADio:CARRier:NUMBer?`

Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Restriction and Notes	"Carrier Bandpass Filter" key is in Mode Setup menu but only EDGE EVM and GSM PFER measurements support this feature. In other measurement, this setting is not appricable.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SINGle
State Saved	Saved in instrument state.
Range	Single | Multi
Key Path	**Mode Setup, Demod**

RF Sync Delay

Adjusts the "T0" point that position is settled in each measurement. This adjustment does not apply if the Bursy Sync key (in each measurement's Meas Setup menu) is set to None. Refer 'How to determine time reference' section in GMSK/EDGE Power vs. Time Measurement Definition for more detailed usage.

This parameter appricable only for these measurements below:
GMSK Phase & Frequency Error measurement
GMSK/EDGE Power vs. Time measurement
GMSK/EDGE Output RF Spectrum measurement
EDGE EVM measurement

Mode	GSM
Remote Command	`[:SENSe]:SYNC:BURSt:RFAMplitude:DELay <time>` `[:SENSe]:SYNC:BURSt:RFAMplitude:DELay?`
Example	SYNC:BURS:RFAM:DEL –10us SYNC:BURS:RFAM:DEL?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–5 ms
Max	5 ms
Key Path	**Mode Setup, Demod**

Burst Search Threshold

Sets the relative power threshold from the peak power, which is used by the burst alignment algorithm to determine the burst rising edge and falling edge.

Mode	GSM
Remote Command	`[:SENSe]:SYNC:BURSt:STHReshold <rel_ampl>`
	`[:SENSe]:SYNC:BURSt:STHReshold?`
Example	:SYNC:BURS:STHR –20
	:SYNC:BURS:STHR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30
State Saved	Saved in instrument state.
Min	–200
Max	–0.01
Key Path	**Mode Setup, Demod**

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

Key Path	**Mode setup**

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

SCPI Command	`:INITiate[:IMMediate]`
Example	`:INIT:IMM`
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.

Remote Command Notes	`:INITiate:RESTart`
	`:INITiate:IMMediate`
	Either of the above commands perform exactly the same function.

SCPI 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.

SCPI Command	`:INITiate:RESTart`
Example	`:INIT:REST`
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.

Remote Command Notes	`:INITiate:RESTart`
	`:INITiate:IMMediate`
	Either of the above commands perform exactly the same function.

SCPI 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.

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`.

Certain conditions may cause an implicit restart to be performed. These are detailed in section "Measurement Related Instrument Settings" in the Swept SA measurement PD.

Single (Single Measurement/Sweep)

Single 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.

Example	`:INIT:CONT OFF`
Remote Command Notes	See **Cont** key description.
Key Path	Front panel key

See Restart 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). 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`.

Cont (Continuous Measurement/Sweep)

Cont 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.

SCPI 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
Key Path	Front panel key

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 Number** (in **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 Number** 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 Number 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 **Continuous** 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's 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.

Sweep / Control

This section describes the keys in the Sweep, Control and Capture menu that are common to multiple Modes and Measurements. See the Measurement descriptions for information on features that are unique.

NOTE	The Meas Uncal (measurement uncalibrated) warning is given in the Status Bar in the lower right corner of the screen when the manual sweep time entered is shorter than what is computed by the instrument.

Key Path **Sweep/Control**

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when `ABORt` is sent, the alignment finishes before the abort function is performed. So `ABORt` does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an `:INIT:IMM` command is received.

SCPI Command	`:ABORt`
Example	`:ABOR`
Remote Command Notes	If `:INITiate:CONTinuous` is `ON`, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If `:INITiate:CONTinuous` is `OFF`, then `:INITiate:IMMediate` is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.

SCPI Status Bits/OPC Dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

SCPI Command	`:INITiate:PAUSe`
Dependencies	Grayed out in Measurements that don't support Pausing. Blanked in Modes that don't support Pausing.
Key Path	**Sweep/Control**

SCPI Command	`:INITiate:RESume`
Dependencies	Grayed out in Measurements that don't support Pausing. Blanked in Modes that don't support Pausing.
Key Path	**Sweep/Control**

Record Data Now

This key makes a data recording using input at the current frequency settings. This key is a duplicate of the Record Data Now key in the Input/Ouput, Data Source menu. It is included in this menu as a convenience to be near the playback and pause functions that it is often used with.

Some settings of the recorded data can be queried remotely, like center frequency, span, rate, length, and data type.

Key Path	**Sweep/Control**

Playback (Recorded Data)

Accesses controls for the playback of a recording. A recording is a long buffer of contiguous time samples together with meta-data about the sample rate and other related state properties at the time it was made. It may be saved and recalled from a file. A recording is typically much longer than a single measurement time record.

When the the instrument data source is recorded data (see Input/Output, Data Source), a measurement takes a complete time record from the recording buffer starting at the current playback position. Then the playback position pointer is moved ahead from 1 to 100% of the current time record length, depending on whether overlap processing is allowed. Data is taken sequentially from the recording until the play position is less than a time record length away from the time stored in the Stop Time property. The measurement can be made to pause at this point, or to loop back to the beginning and continue if more time records are needed. (It resets the play position to the Start Time for this loop back funtionality.) Initially the Start Time and Stop Time properties are set to the beginning and end of the recording, but they can be restricted to a portion of it.

Some settings of the recorded data can be queried remotely, like center frequency, span, rate, length, and data type.

Key Path	**Sweep/Control**

Playback Position

This lets you to view or change the current playback position. It is not an active function, so the arrow keys and knob have no effect on it. It must be entered numerically.

SCPI Command	`[:SENSe]RECording:PLAYback:POSition <time>`
	`[:SENSe]RECording:PLAYback:POSition?`
Example	REC:PLAY:POS 1 US
Dependencies/Couplings	Measurement restart sets this back to the Start Time (minus any points needed for settling the measurement)
Preset	0
Min	0
Max	End of recording
SCPI Resolution	0
Key Path	**Sweep/Control, Playback**

Start Time

This is where the playback position is set to when a measurement is restarted, or loops back from the end of the recording.

SCPI Command	`[:SENSe]RECording:PLAYback:STARt <time>`
	`[:SENSe]RECording:PLAYback:STARt?`
SCPI Command	`[:SENSe]RECording:PLAYback:STARt:AUTO OFF|ON|0|1`
	`[:SENSe]RECording:PLAYback:STARt:AUTO?`
Example	REC:PLAY:STAR 2 US
	REC:PLAY:STAR:AUTO ON
Dependencies/Couplings	If Start Time is set after the current play position, then the play position is updated to the new start time at the next measurement. If this is set greater than the stop time and a measurement is started, an error is generated.
	Setting the start time via front panel or SCPI forces this to Man. Recalling a recording file or making a new recording sets this to Auto
Remote Command Notes	Selecting Auto sets the Start Time to 0
Preset	On, 0 s
State Saved	No
Min	0
Max	End of recording
Key Path	**Sweep/Control, Playback**

Stop Time

No measurement data will be taken after this position in the recording buffer. If there is not a complete time record length between the playback position and the stop time, the measurement either pauses or loops back to the start time setting. The Loop at End setting determines which of these it does.

Remote Command	`[:SENSe]RECording:PLAYback:STOP <time>`
	`[:SENSe]RECording:PLAYback:STOP?`
Remote Command	`[:SENSe]RECording:PLAYback:STOP:AUTO OFF|ON|0|1`
	`[:SENSe]RECording:PLAYback:STOP:AUTO?`

Example	REC:PLAY:STOP 2 US REC:PLAY:STAR:AUTO ON
Dependencies/Couplings	If Stop Time is set prior to the current play position plus time record length, then the play position loops back to the Start time at the next measurement. If this is set less than the start time and a measurement is started, an error is generated Setting the stop time via front panel or SCPI forces this to manual. Recalling a recording file or making a new recording sets this to auto
Remote Command Notes	Selecting Auto sets the Stop Time to the end of the data.
Preset	End of recording, Auto On
State Saved	No
Min	0
Max	End of recording
Key Path	**Sweep/Control, Playback**

Loop at End

This setting determines whether the measurement stops, or resets the play position back to the start time, when there is not enough data left between the playback position and the stop time.

Remote Command	`[:SENSe]RECording:PLAYback:LOOP OFF|ON|0|1` `[:SENSe]RECording:PLAYback:LOOP?`
Example	REC:PLAY:LOOP ON
Preset	ON
State Saved	No
Key Path	**Sweep/Control, Playback**

Querying Recording Information

Various information about the recording is saved with the recording and can be queried remotely:

- Measurement center frequency when recording was made

- Span setting when recording was made
- Span of the recording (may be larger than the measurement span setting)
- Sample rate of recording
- Time length of recording
- Whether recording is complex or real

Remote Command `[:SENSe]:RECording:PLAYback:FREQuency:CENTer?`

Remote Command Notes Query Only

Returns the center frequency at which the recording was made

Remote Command `[:SENSe]:RECording:PLAYback:FREQuency:SPAN?`

Remote Command Notes Query Only

Returns the span setting when the recording was initiated. The actual recording span may be greater.

Remote Command `[:SENSe]:RECording:PLAYback:FREQuency:SPAN:MAX?`

Remote Command Notes Query Only

Returns the actual span at which the recording was made. The actual recording span may be greater than the span that was displayed when the recording was initiated.

Remote Command `[:SENSe]:RECording:PLAYback:LENGth?`

Remote Command Notes Query Only

Returns the length (in seconds) of the recording.

Remote Command `[:SENSe]:RECording:PLAYback:SRATe?`

Remote Command Notes Query Only

Returns the sample rate (in Hz) of the data in the recording..

Remote Command	`[:SENSe]:RECording:PLAYback:ZOOM?`
Remote Command Notes	Query Only Always returns 1 currently for MXA (0 means data is real, 1 means it is complex)

Gate

The Gate key in the Sweep/Control menu 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 meas global, so the settings will be the same in all the measurements.

Note that Sweep Time autocoupling rules and annotation are changed by Gate being on.

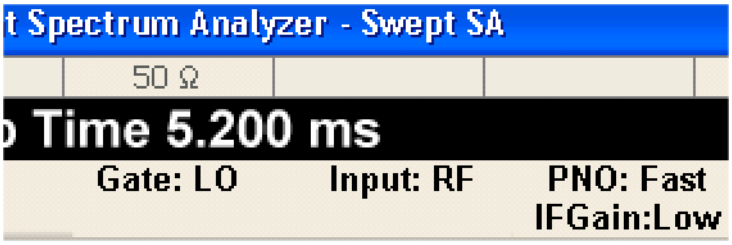
Key Path **Sweep/Control**

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 and video system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the Meas Bar reflects that it is on and what method is used, as seen in the “Gate: LO” annunciator below.



SCPI Command	`[:SENSe]:SWEep:EGATe[:STATe] OFF|ON|0|1` `[:SENSe]:SWEep:EGATe[:STATe]?`

Example	SWE:EGAT ON SWE:EGAT?
Dependencies	The function is unavailable (grayed out) and Off when: Gate Method is LO or Video and FFT Sweep Type is manually selected. Gate Method is FFT and Swept Sweep Type is manually selected. Marker Count is ON.
Coupling	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 is ignored (if user sets these values) and measurement works like as all Offset Res BW and all Offset Video BW are coupled with Res BW and Video BW under BW menu. When Gate is on, Offset BW key in Offset/Limit menu is grayed out.
Preset	Off
Range	On | Off
State Saved	Saved in State
Key Path	Sweep/Control, **Gate**

Gate View On/Off

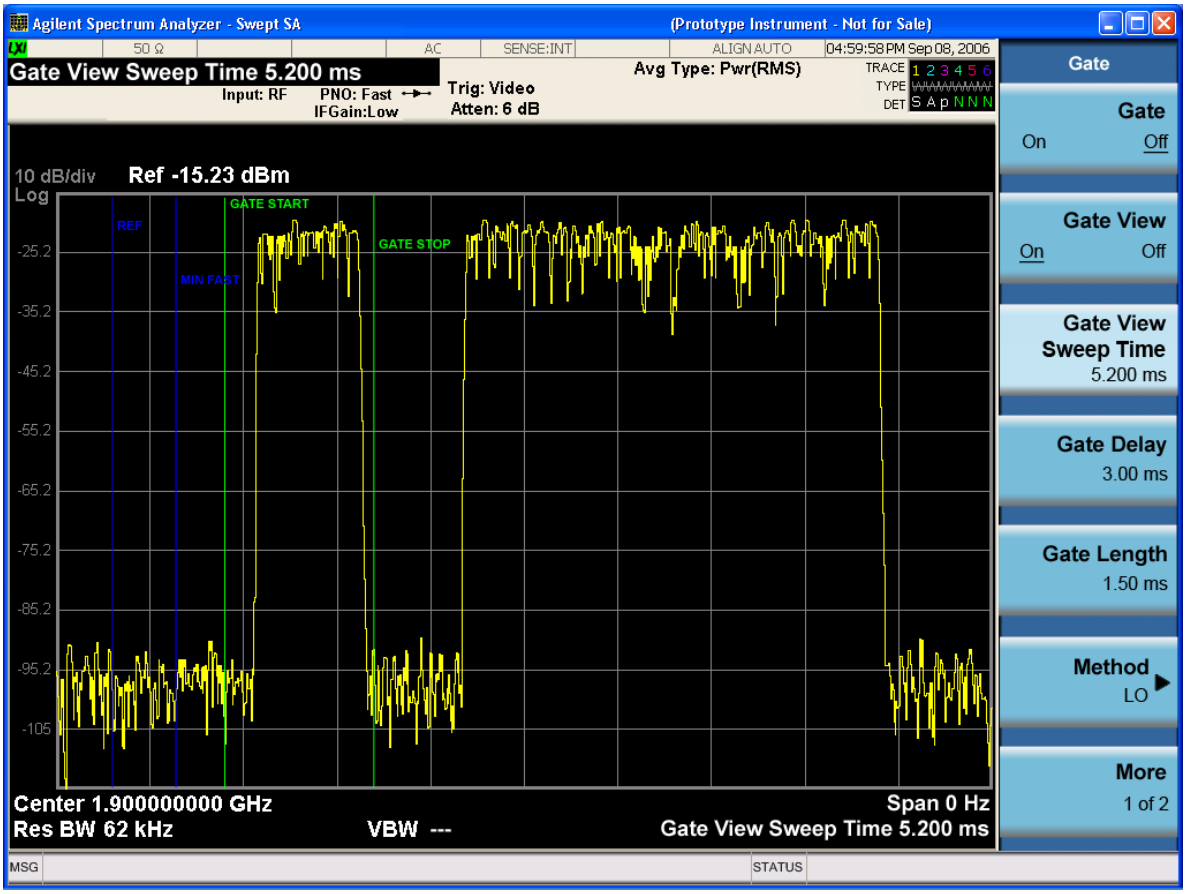
Turning on Gate View in the Swept SA measurement provides a single-window gate view display.

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.

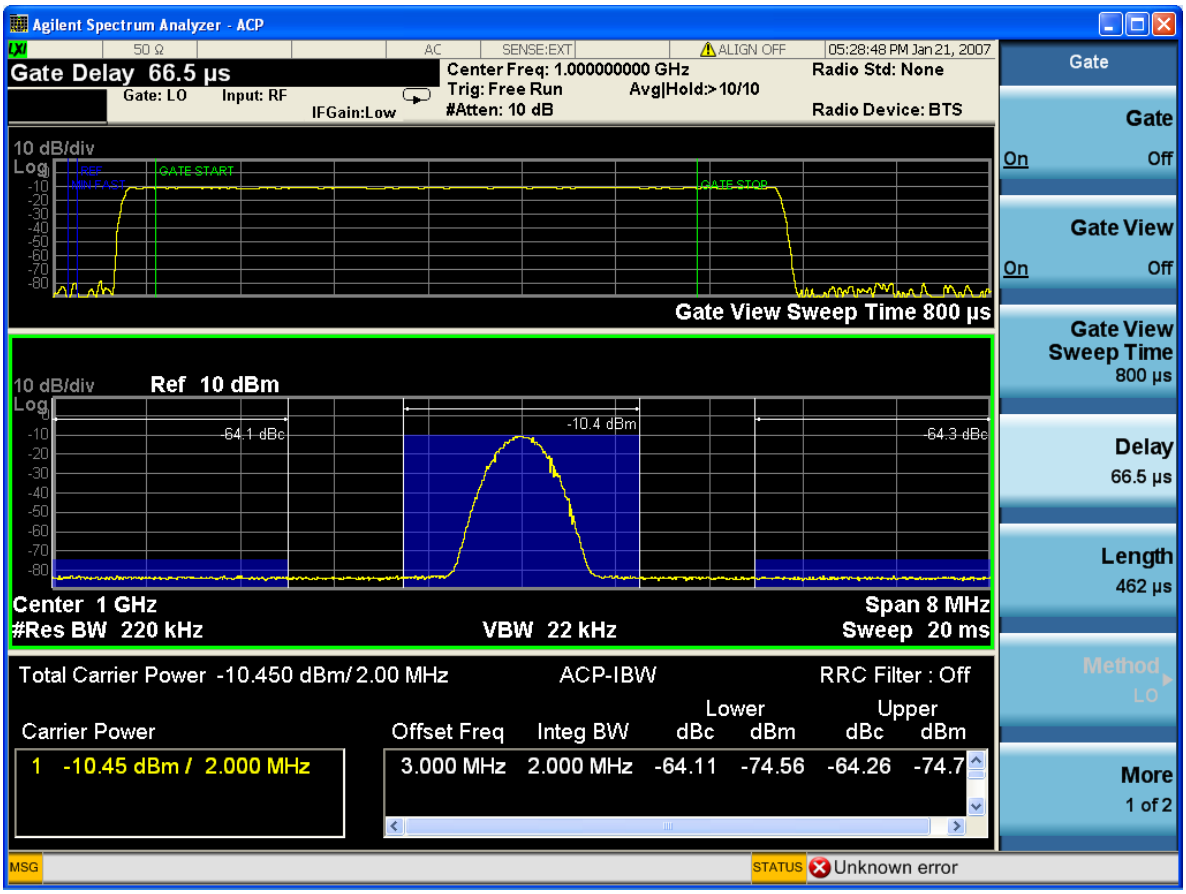
Key Path	Sweep/Control, Gate
SCPI Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.

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 the user presses **Last Span** 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. • 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.
Dependencies	In the Swept SA measurement: In Gate View, the regular Sweep Time key is grayed out, to avoid confusing the user who wants to set Gate View Sweep Time. 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 Sweep Time is set to the gate view sweep time.
Preset	OFF
State Saved	Saved in state
Range	On | Off
Annunciation	For Gate View to work properly, a gate signal must be present at the selected Gate Source. Therefore, in Gate View, any time more than 2 seconds passes with no gate signal, a pop-up message "Waiting for gate input" appears. This message goes away when a gate signal appears.

A sample of the Gate View screen in the Swept SA measurement is shown below:



A sample of the Gate View screen in other measurements is shown below. 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 Meas 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, even in FFT. In Level Gate a line is shown only for Delay. 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 LO and Gated Video, these lines are positioned relative to the *delay reference* line (*not* relative to 0 time). 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.
- The second blue line is labeled “MIN FAST” as shown in the figure above because it represents the minimum Gate Delay for fast gated LO operation. This line is only displayed in Gated LO. You cannot scroll (knob) or decrement (down key) the Gate Delay to less than that represented by the position of this line, it can only be set below this position manually, although once there it can be moved freely with the knob while below the line.
- A yellow line in the Gated Video case only, is displayed at B_{length}, where B_{length} is the bucket length for the swept trace, which is given by the sweep time for that trace divided by number of Points - 1. So it is referenced to 0 time, not to the delay reference. This line is labeled NEXT PT (it is not shown in the figure above because the figure above is for Gated LO).

  The yellow line represents the edge of a display point (bucket). Normally in Gated Video, the bucket length must be selected so that it exceeds the off time of the burst. There is another way to use the analyzer in Gated Video measurements, and that is to set the bucket width much shorter than the off time of the burst. Then use the Max Hold trace function to fill in “missing” buckets more slowly. This allows you to see some of the patterns of the Gated Video results earlier, though seeing a completely filled-in spectrum later.

Gate View Sweep Time

Controls the sweep time in the Gate View window. In order to provide an optimal view of the gate signal, the analyzer initializes Gate View Sweep Time based on the current settings of Gate Delay and Gate Length.

SCPI Command	`[:SENSe]:SWEep:EGATe:TIME <time>` `[:SENSe]:SWEep:EGATe:TIME?`
Example	SWE:EGAT:TIME 500 ms
Dependencies	Gate View Sweep Time is initialized: — on Preset (after initializing delay and length). — every time the Gate Method is set/changed. Additionally, in the Swept SA measurement, whenever you do a Preset, or leave Gate View, the analyzer remembers the Gate Delay and Gate Length settings. Then, when returning to Gate View, if the current Gate Delay and/or Gate Length do not match the remembered values Gate View Sweep Time is re-initialized.

Preset	519.3 µs WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms
State Saved	Saved in state
Min	1 µs
Max	6000 s
Key Path	Sweep/Control, Gate

Gate Delay

Controls the length of time from the time the gate condition goes True until the gate is turned on.

SCPI Command	`[:SENSe]:SWEep:EGATe:DELay <time>` `[:SENSe]:SWEep:EGATe:DELay?`
Example	SWE:EGAT:DELay 500ms SWE:EGAT:DELay?
Remote Command Notes	Units of time are required or no units; otherwise an invalid suffix error will be generated. See error -131.
Preset	57.7us WiMAX OFDMA: 71 us GSM/EDGE: 600 us
State Saved	Saved in state
Min	0.0 us
Max	100 s
Key Path	**Sweep/Control, Gate**

Gate Length

Controls the length of time that the gate is on after it opens.

SCPI Command	`[:SENSe]:SWEep:EGATe:LENGth <time>` `[:SENSe]:SWEep:EGATe:LENGth?`

Example	SWE:EGAT:LENG 1 SWE:EGAT:LENG?
Dependencies	Grayed out when Gate Method is set to FFT in which case the label changes to that shown below.  The key is also grayed out if Gate Control = Level.
Remote Command Notes	Units of time are required or no units; otherwise an invalid suffix will be generated.
Preset	461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us
State Saved	Saved in state
Min	100 ns
Max	5 s
Key Path	**Sweep/Control, Gate**

Method

This lets you choose one of the three different types of gating. Not all types of gating are available for all measurements.

SCPI Command	`[:SENSe]:SWEep:EGATe:METHod LO|VIDeo|FFT` `[:SENSe]:SWEep:EGATe:METHod?`
Example	SWE:EGAT:METH FFT
Preset	LO
State Saved	Saved in state
Key Path	Sweep/Control, Gate

LO

When set to Gate (On), the LO sweeps whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the **Gate Source.**

This form of gating is more sophisticated, and results in faster measurements. With Gated

LO, the analyzer only sweeps while the gate conditions are satisfied. This means that a sweep could take place over several gate events. It would start when the gate signal goes true and stop when it goes false, then continue when it goes true again. But since the LO is sweeping as long as the gate conditions are satisfied, the sweep typically finishes much more quickly than with Gated Video.

When in zero span, there is no actual sweep performed. But data is only taken while the gate conditions are satisfied. So even though there is no sweep, the gate settings will impact when data is acquired.

Dependencies	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out.
Key Path	**Sweep/Control, Gate, Method**

Video

When set to Gate (On), the video signal is allowed to pass through whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the **Gate Source**.

This form of gating may be thought of as a simple switch, which connects the signal to the input of the spectrum analyzer. When the gate conditions are satisfied, the switch is closed, and when the gate conditions are not satisfied, the switch is open. So we only look at the signal while the gate conditions are satisfied.

With this type of gating, you usually set the analyzer to sweep very slowly. In fact, a general rule is to sweep slowly enough that the gate is guaranteed to be closed at least once per bucket (data measurement interval). Then if the peak detector is used, each bucket will represent the peak signal as it looks with the gate closed.

Dependencies	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out
Key Path	**Sweep/Control, Gate, Method**

FFT

When set to Gate (On), the an FFT is performed whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the **Gate Source.** This is an FFT measurement which begins when the gate conditions are satisfied. Since the time period of an FFT is approximately 1.83/RBW, you get a measurement which starts under predefined conditions and takes place over a predefined period. So, in essence, this is a gated measurement. You have limited control over the gate length but it works in FFT sweeps,

which the other two methods do not.

Gated FFT cannot be done in zero span since the instrument is not sweeping. So in zero span the Gated LO method is used. Data is still only taken while the gate conditions are satisfied, so the gate settings do impact when data is acquired.

The Gate Length will be 1.83/RBW.

This is a convenient way to make a triggered FFT measurement under control of an external gating signal.

Dependencies	Key is unavailable when Gate is On and Swept Sweep Type manually selected. Key is unavailable when gate Control is set to Level. When selected, Sweep Type is forced to FFT and the Swept key in Sweep Type is grayed out Forces Gate Length to 1.83/RBW (see Length key description above)
Key Path	**Sweep/Control, Gate**

Gate Source

The menus under the Gate Source key are a duplicate of the Trigger setup keys. Any trigger settings changes made under Gate Source also affect settings under Trigger, and vice versa. However the selected Trigger Source does not have to match the Gate Source.

SCPI Command	`[:SENSe]:SWEep:EGATe:SOURce EXTernal1|EXTernal2|LINE|FRAMe|RFBurst` `[:SENSe]:SWEep:EGATe:SOURce?`
Preset	EXTernal 1 GSM/EDGE: FRAMe
Key Path	**Sweep/Control, Gate**

Control Edge/Level

Sets the method of controlling the gating function from the gating signal.

Edge

In Edge triggering, the gate opens (after the Delay) on the selected edge (for example, positive) of the gate signal and closes on the alternate edge (for example, negative).

Level

In Level triggering, the gate opens (after the Delay) when the gate signal has achieved a certain level and stays open as long as that level is maintained.

SCPI Command	`[:SENSe]:SWEep:EGATe:CONTrol EDGE|LEVel`
	`[:SENSe]:SWEep:EGATe:CONTrol?`
Example	SWE:EGAT:CONT EDGE
Dependencies	If the Gate Method is FFT the Control key is grayed out and Edge is selected.
	If the Gate Source is TV, Frame or Line, the Control key is grayed out and Edge is selected.
Preset	EDGE
State Saved	Saved in stat
Key Path	**Sweep/Control, Gate**

Min Fast Position Query (Remote Command Only)

This command queries the position of the MIN FAST line, relative to the delay reference (REF) line. If this query is sent while not in gate view, the MinFast calculation is performed based on the current values of the appropriate parameters and the result is returned. Knowing this value lets you to set an optimal gate delay value for the current measurement setup.

Parameter Name	Backwards Compatibility External Gate Level
SCPI Command	`[:SENSe]:SWEep:EGATe:MINFast?`
Example	SWE:EGAT:MIN?

Trigger

The Trig front panel key accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The trigger settings are usually common for all the measurements in a mode. However, the settings can change from mode to mode.

While the settings are usually common to all measurements, the selection of the Trigger Source is unique for each measurement. See the individual measurement descriptions for information on the trigger source selection for that measurement.

Key Path	Front-panel key
SCPI 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.

The trigger functions let you select the trigger settings for a sweep or measurement. When using a trigger source other than Free Run, the analyzer will begin a sweep only with the selected trigger conditions are met. A trigger event is defined as the point at which your trigger source signal meets the specified trigger level and polarity requirements (if any). In FFT measurements, the trigger controls when the data is acquired for FFT conversion.

For each source in the Trigger menu, a setup menu exists which can be accessed by pressing the key for that 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. The setup menus (there is one for each trigger source) allow you to set all of the settings for that trigger source.

Each source’s trigger settings (for example, level, delay and slope) 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 this reason, the only SCPI node that exists for the settings is the :TRIGger[:SEQuence] subsystem.

NOTE

The trigger source is uniquely selected for each measurement in the application. The trigger source setting is the only trigger parameter that is meas local, applying only to the current measurement.

The trigger source SCPI command shown below must be measurement qualified using the <measurement> syntax. (For example, TRIG:MONitor:SOUR). See each

measurement for more information.

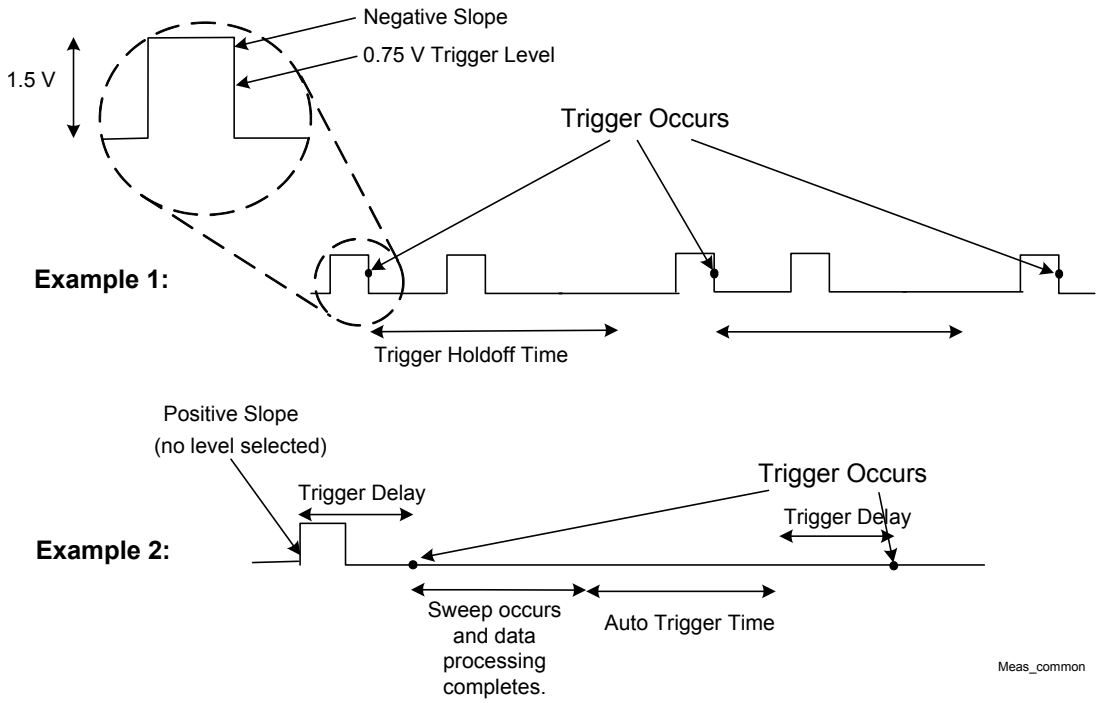
Remote Command	`:TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:<measurement>[:SEQuence]:SOURce?`
Example	TRIG:ACP:SOUR EXT1 selects the external 1 trigger input for the ACP measurement in the current mode. TRIG:SOUR VID selects video triggering for the SANalyzer measurement in the Spectrum Analyzer mode. (SAN does not require the <meas> keyword.)
Remote Command Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation in your specific measurement to see what is available. Possible sources include: IMMediate - free run triggering VIDeo - triggers on the video signal level LINE - triggers on the power line signal EXTernal1 - triggers on an externally connected trigger source on the rear panel EXTernal2 - triggers on an externally connected trigger source on the front panel FRAMe - triggers on the periodic timer RFBurst - triggers on the bursted frame 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.

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.

Example	TRIG:<meas>:SOUR IMM
State Saved	Yes
Key Path	Trig
SCPI 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.

Video

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.

Example	TRIG:<meas>:SOUR VID selects video triggering.
Dependencies	Video trigger is allowed in average detector mode.
State Saved	Yes
Key Path	Trig
SCPI 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.

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.

SCPI Command	`:TRIGger[:SEQuence]:VIDeo:LEVel <ampl>` `:TRIGger[:SEQuence]:VIDeo:LEVel?`
Example	TRIG:VID:LEV -40 dBm
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.
Dependencies	The range of the Video Trigger Level is dependent on the Reference Level.
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	Yes
Min	Same as reference level
Max	Same as reference level

Key Path	Trig, Video
Default Terminator	depends on the current selected Y axis unit

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI Command	`:TRIGger[:SEQuence]:VIDeo:SLOPe POSitive|NEGative`
	`:TRIGger[:SEQuence]:VIDeo:SLOPe?`
Example	TRIG:VID:SLOP NEG
Preset	POSitive
State Saved	Yes
Key Path	Trig, Video

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..

SCPI Command	`:TRIGger[:SEQuence]:VIDeo:DELay <time>`
	`:TRIGger[:SEQuence]:VIDeo:DELay?`
BAF SCPI Command	`: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
Preset	Off, 1 us
State Saved	Yes
Min	-150 ms
Max	+500 ms
Key Path	Trig, Video
Default Terminator	s

Line

Pressing this key, when it is not selected, selects the line signal as the trigger. A new sweep/measurement will start synchronized with the next cycle of the line voltage. Pressing this key, when it is already selected, access the line trigger setup menu.

Example	TRIG:<meas>:SOUR LINE selects line triggering.
Dependencies	Line trigger is not available when operating from a “dc power source”, for example, when the instrument is powered from batteries.
State Saved	Yes
Key Path	Trig
SCPI 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.

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI Command	`:TRIGger[:SEQuence]:LINE:SLOPe POSitive|NEGative`
	`:TRIGger[:SEQuence]:LINE:SLOPe?`
Example	TRIG:LINE:SLOP NEG
Preset	POSitive
State Saved	Yes
Key Path	Trig, Line

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.

SCPI Command	`:TRIGger[:SEQuence]:LINE:DELay <time>`
	`:TRIGger[:SEQuence]:LINE:DELay?`
BAF SCPI Command	`:TRIGger[:SEQuence]:LINE:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:LINE:DELay:STATe?`
Example	TRIG:LINE:DEL:STAT ON
	TRIG:LINE:DEL 100 ms
Preset	Off, 1.000 us
State Saved	Yes
Min	-150 ms
Max	500 ms
Key Path	Trig, Line
Default Terminator	S

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.

Example	TRIG:<meas>:SOUR EXT1 This selects the external 1 trigger input on the rear panel.
State Saved	Yes
Key Path	Trig
SCPI 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.

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

SCPI 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	Yes
Min	-5 V
Max	5 V
Key Path	Trig, External 1
Default Terminator	V

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI 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	Yes
Key Path	Trig, External 1

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.

SCPI Command	`:TRIGger[:SEQuence]:EXTernal1:DELay <time>`
	`:TRIGger[:SEQuence]:EXTernal1:DELay?`
BAF SCPI Command	`: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
Preset	Off, 1.000 us
State Saved	Yes
Min	-150 ms
Max	+500 ms
Key Path	Trig, External 1
Default Terminator	s

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.

Example	TRIG:<meas>:SOUR EXT2 This selects the rear panel external 2 trigger input.
State Saved	Yes
Key Path	Trig
SCPI 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.

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

SCPI 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	Yes
Min	-5 V
Max	5 V
Key Path	Trig, External 2
Default Terminator	V

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI 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	Yes
Key Path	Trig, External 2

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. See the range limitation note in section

SCPI Command	`:TRIGger[:SEQuence]:EXTernal2:DELay <time>`
	`:TRIGger[:SEQuence]:EXTernal2:DELay?`
BAF SCPI Command	`: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
Preset	Off, 1.000 us
State Saved	Yes
Min	-150 ms
Max	500 ms
Key Path	Trig, External 2
Default Terminator	s

RF Burst (Wideband)

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.

Example	TRIG:<meas>:SOUR RFB
Key Path	Trig
State Saved	Yes
SCPI 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.

Trigger Level

Sets the absolute trigger level for the RF burst envelope. See key notes regarding the relative trigger

level.

SCPI Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl>` `:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?`
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	Yes
Min	-200 dBm
Max	100 dBm
Key Path	Trig, RF Burst
Default Terminator	Absolute trig level: depends on the current selected amplitude units.

SCPI Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:RELative <rel_ampl>` `:TRIGger[:SEQuence]:RFBurst:LEVel:RELative?`
Preset	-6 dB GSM: -25 dB
State Saved	Yes
Min	-45 dB
Max	0 dB
Key Path	Trig, RF Burst
Default Terminator	dB or dBc

SCPI Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE ABSolute|RELative` `:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE?`
Example	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm.
Remote Command Notes	The relative trigger level is not available for the MXA-1 release. Thus, this command should not be introduced into the system until all relative trigger level commands would cause SCPI execution error.
Preset	ABSolute

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI 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	Yes
Key Path	Trig, RF Burst

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..

SCPI Command	`:TRIGger[:SEQuence]:RFBurst:DELay <time>`
	`:TRIGger[:SEQuence]:RFBurst:DELay?`
BAF SCPI Command	`: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
Preset	Off, 1.000 us
State Saved	Yes
Min	-150 ms
Max	500 ms
Key Path	Trig, RF Burst
Default Terminator	s

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.

Example	TRIG:<meas>:SOUR FRAM
State Saved	Yes
Key Path	Trig
SCPI 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.

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**.

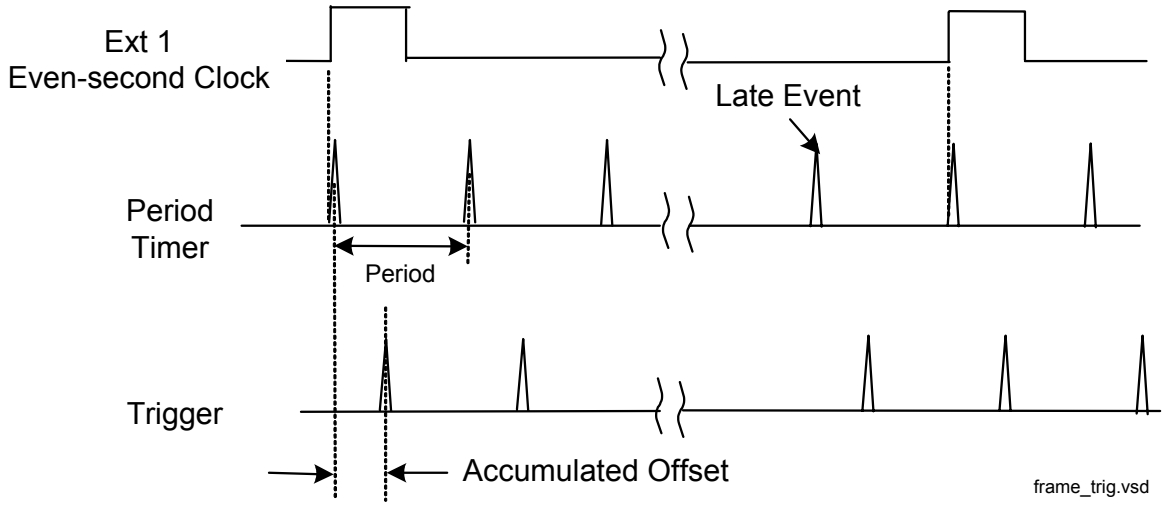
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we’ll explain some uses for the periodic trigger.

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 mis-trigger. Mis-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.

SCPI 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	Yes
Min	100.000 ns

Max	559.0000 ms
Key Path	Trig, Periodic Timer
Default Terminator	S

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 RPG or the SCPI adjust command, serves to delay the timing of the trigger event.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:OFFSet <time>` `:TRIGger[:SEQuence]:FRAMe:OFFSet?`
Example	TRIG:FRAM:OFFS 1.2 ms
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.
Remote Command 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.
Preset	0 s
State Saved	Yes
Min	-10.000 s
Max	10.000 s
Key Path	Trig, Periodic Timer

Default Terminator	S

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.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:ADJust <time>`
Example	TRIG:FRAM:ADJ 1.2 ms
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.
Remote Command 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.
Preset	0 s
State Saved	Yes
Min	-10.000 s
Max	10.000 s
Default Terminator	S

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.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:OFFSet:DISPlay:RESet`

Example	TRIG:FRAM:OFFS:DISP:RES
Key Path	Trig, Periodic Timer

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.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:SYNC EXTernal1|EXTernal2|RFBurst|OFF`
	`:TRIGger[:SEQuence]:FRAMe:SYNC?`
Example	TRIG:FRAM:SYNC EXT2
Preset	Off
	GSM/EDGE: RFBurst
State Saved	Yes
Key Path	Trig, Periodic Timer

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.

Example	TRIG:FRAM:SYNC OFF
Key Path	Trig, Periodic Timer, Sync Source

External 1

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic trigger synchronization. Pressing this key, when it is already selected, accesses the external 1 sync source setup menu.

Example	TRIG:FRAM:SYNC EXT

Couplings	Same as External 1 trigger source.
Remote Command Notes	See section Sync Source
Key Path	Trig, Periodic Timer, Sync Source

Trigger Level

Sets the value where the signal at the external 1 trigger input will synchronize with the periodic timer trigger.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel <voltage>` `:TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel?`
Example	TRIG:FRAM:EXT1:LEV 0.5 V
Couplings	This same level is used in the Ext1 trigger source in the Trigger menu, for the period 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	Yes
Min	-5 V
Max	5 V
Key Path	Trig, Periodic Timer, Sync Source, External 1
Default Terminator	V

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe?`
Example	TRIG:FRAM: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	Yes
Key Path	Trig, Periodic Timer, Sync Source, External 1

External 2

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic frame trigger synchronization.

Pressing this key, when it is already selected, accesses the external 2 sync source setup menu.

Example	TRIG:FRAM:SYNC EXT2
Couplings	Same as External 2 trigger source.
Key Path	Trig, Periodic Timer, Sync Source

Trigger Level

Sets the value where the signal at the external 2 trigger input will synchronize with the frame timer trigger.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal2:LEVel` `:TRIGger[:SEQuence]:FRAMe:EXTernal2:LEVel?`
Example	TRIG:FRAM:EXT2:LEV 0.5 V
Couplings	This same level is used in the Ext2 trigger source in the Trigger menu, for the period 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	Yes
Min	-5 V
Max	5 V
Key Path	Trig, Periodic Timer, Sync Source, External 2
Default Terminator	V

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe?`
Example	TRIG:FRAM:EXT2:SLOP NEG
Couplings	This same slope is used in the Ext2 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	Yes
Key Path	Trig, Periodic Timer, Sync Source, External 2

RF Burst (Wideband)

Pressing the key once selects the RF burst envelope signal to be used for the periodic timer trigger synchronization.

Press the key a second time to access the RF burst sync source setup menu.

Example	TRIG:FRAM:SYNC RFB
Couplings	Same as RF Burst trigger source.
Key Path	Trig, Periodic Timer, Sync Source

Trigger Level

Same as Trigger level under RF Burst section Trigger Level.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:RFBurst:LEVel:ABSolute <ampl>` `:TRIGger[:SEQuence]:FRAMe:RFBurst:LEVel:ABSolute?`
Couplings	This same level is used in the RF Burst trigger source in the Trigger menu, for the period 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	Yes
Min	-100 dBm
Max	100 dBm
Key Path	Trig, Periodic Timer, Sync Source, RF Burst
Default Terminator	Absolute trig level: depends on the current selected amplitude units

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe?`

Example	TRIG:FRAM:RFB:SLOP NEG
Couplings	This same slope is used in the RF Burst 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	Yes
Key Path	Trig, Periodic Timer, Sync Source, RF Burst

Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:DELay <time>`
	`:TRIGger[:SEQuence]:FRAMe:DELay?`
BAF SCPI Command	`:TRIGger[:SEQuence]:FRAMe:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:FRAMe:DELay:STATe?`
Preset	Off, 1.000 us
State Saved	Yes
Min	-150 ms
Max	+500 ms
Key Path	Trig, Periodic Timer
Default Terminator	s

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.

SCPI Command	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff <time>`
	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff?`

BAF SCPI Command	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe?`
Preset	On, 1.000 ms
State Saved	Yes
Min	0 ms
Max	+500 ms
Key Path	Trig, Periodic Timer
Default Terminator	s

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.

SCPI Command	`:TRIGger[:SEQuence]:ATRigger <time>`
	`:TRIGger[:SEQuence]:ATRigger?`
BAF SCPI Command	`:TRIGger[:SEQuence]:ATRigger:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:ATRigger:STATe?`
Example	TRIG:ATR:STAT ON
	TRIG:ATR 100 ms
Preset	Off, 100 ms
State Saved	Yes
Min	0 s
Max	100 s
Key Path	Trig
Default Terminator	s

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.

SCPI Command	`:TRIGger[:SEQuence]:HOLDoff <time>`
	`:TRIGger[:SEQuence]:HOLDoff?`
BAF SCPI Command	`:TRIGger[:SEQuence]:HOLDoff:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:HOLDoff:STATe?`
BAF Preset	OFF
Example	TRIG:HOLD:STAT ON
	TRIG:HOLD 100 ms
	Supplemental Information
Preset	Off, 100 ms
State Saved	Yes
Min	0 s
Max	0.5 s
Key Path	Trig
Default Terminator	s

6 Burst Power(Transmit Power)

The Burst Power (Transmit Power) measurement (at the base transceiver station) is used to determine the power delivered to the antenna system on the radio-frequency channel under test. The Burst Power measurement verifies the accuracy of the mean transmitted RF carrier power. This can be done across the frequency range and at each power step.

Mobile stations and base transceiver stations must transmit enough power, with sufficient modulation accuracy, to maintain a call of acceptable quality without leaking power into frequency channels or timeslots allocated for others. The Burst Power measurement determines the average power for an RF signal burst at or above a specified threshold value or during the detected burst width. The threshold value may be absolute, or relative to the peak value of the signal. Burst width can be set automatically or manually.

Key Path **Front-panel key**

Remote Command Results:

The following commands are used to retrieve the measurement results:

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:TXPower|BPOWer commands for more measurement related commands.

NOTE The BPOWer form of the commands is included for backward compatibility only. They are not recommended for use in new designs. Use the TXPower keyword.

```
:CONFigure:TXPower|BPOWer

:CONFigure:TXPower|BPOWer:NDEFault

:INITiate:TXPower|BPOWer

:FETCh:TXPower|BPOWer[n]?

:READ:TXPower|BPOWer[n]?

:MEASure:TXPower|BPOWer[n]?
```

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

not specified or n = 1	Returns the following comma-separated scalar results: Sample time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc). Power is the mean power (in dBm) of the power value that calculated by specified method: above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition. Power averaged is the power (in dBm) for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of Power averaged is the same as the Power value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.). Threshold value is the absolute threshold level (in dBm) above which the power is calculated when Meas Method is set to Above Threshold. Threshold points is the number of points that were above the threshold and were used to calculate Mean Transmit Power when Meas Method is set to Above Threshold. If Meas Method is set to Measured Burst Width, Measured Pts is returned. Maximum value is the maximum peak level of the most recently acquired trace data (in dBm). Minimum value is the minimum peak level of the most recently acquired trace data (in dBm). Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is 0. Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is zero. Measured width is the time length that is used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is zero. Measured points is the number of points used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is 0.
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

3	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. * This is not available in TD-SCDMA.
4	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. * This is not available in TD-SCDMA.

Burst Power Measurement Results

This measurement consists of one view, which consists of two windows.

RF Envelope window (upper)

Metrics Results window (lower)

The bar graph represents the measured portion of the trace. It is the blue bar in the second figure. Its state (On/Off) is controlled by the Bar Graph keyunder the View/Display key.

RF Envelope window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,3,4)

Metrics window

Name	Corresponding Results	Display Format
Mean Transmit Power Above Threshold or Measured Burst Width	n=1 3rd Power Value above the threshold or measured burst width for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of power averaged is the same as the Mean Transmit Power of Current Data.	99.99 dBm
Full Burst Width	n=1 9th Burst width that is determined by the Threshold Lvl.	999.9 us
Measured Width	n=1 10th Time length that is used to calculate Mean Transmit Power when Meas Method is Measured Burst Width. If Meas Method is set to Above Threshold, disappear from the window.	999.9 us
Above Thresh Pts	n=1 6th Number of points that were above the threshold level and were used for the power calculation when Meas Method is Above Threshold Level.	9999

Thresh Pts	N=1 6th Number of points that were used for the power calculation when Meas Method is Measured Burst Width.	9999
Abs Amplitude Threshold	n=1 5th Threshold value is the threshold (in dBm) above which the power is calculated.	99.99 dBm
Rel Amplitude Threshold	Threshold (in dB) relative to the peak carrier level above which the power is calculated	99.99 dB
Mean Transmit power (Current data)	n=1 2nd Power value above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.	99.99 dBm
Max Pt	n=1 7th Maximum peak level of the most recently acquired trace data.	99.99 dBm
Min Pt	n=1 8th Minimum peak level of the most recently acquired trace data.	99.99 dBm

SPAN X Scale

This key accesses functions to control x axis settings and is the same across all modes. Many of the lower-level menu keys are also the same. Unique functions are described below. Refer to Analyzer Setup for more information about common functions.

Key Path	**Front panel key**

Ref Value

Allows you to set the display X reference value.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:RLEV 1s
	DISP:TXP:VIEW:WIND:TRAC:X:RLEV?
Restriction and Notes	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s
State Saved	Saved in instrument state.
Min	–10.0 s
Max	10.00 s
Key Path	**SPAN X Scale**

Scale/Div

Allows you to set the display X scale/division value.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:PDIV 1ms
	DISP:TXP:VIEW:WIND:TRAC:X:PDIV?
Restriction and Notes	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	64.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**SPAN X Scale**

Ref Position

Allows you to set the display X reference position to Left, Center or Right.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:RPOS LEFT
	DISP:TXP:VIEW:WIND:TRAC:X:RPOS?

Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Allows you to toggle the X auto scaling function between On and Off.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:COUP OFF DISP:TXP:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X Rel Value or X Scale/Div manually, X Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. Many of the parameter values are measurement dependent. Attenuation values, and the Internal Preamp selection are measurement global, so they are common across all measurements. Functions with operation unique to this measurement are described below. Refer to the Analyzer Setup section for more information about common functions.

Key Path	**Front panel key**

Y Ref Value

Sets the absolute power reference.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RLEV 5dbm DISP:TXP:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Internal Preamp

Accesses keys that control the internal preamps. Turning on the preamp gives a better noise figure, but a less desirable TOI to noise floor dynamic range. You can optimize this setting for your particular measurement.

Preamp on/off and Preamp Band are Meas common across all measurements.

Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. In "Pre-Adjust for Min Clip" this value can change at the start of every measurement.

All parameters in the Attenuation menus are common across all measurements.

Key Path	**AMPTD Y Scale**

Scale/Division

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIV ision <rel_ampl>`
	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIV ision?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:SCAL:PDIV 10dB
	DISP:TXP:VIEW:WIND:TRAC:Y:SCAL:PDIV?
Dependencies/Couplings	When the Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00 dB

State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Key Path	**AMPTD Y Scale**

Ref Position

Allows you to set the display reference position to either, Top, Center or Bottom.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:TXP:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the Y axis auto scaling function between On and Off.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`

Example	DISP:TXP:VIEW:WIND:TRAC:Y:COUP 0 DISP:TXP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 the user sets a value either Y Rel Value or Y Scale/Div manually, this parameter automatically is set to 'Off'.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

The View/Display key opens up the View menu for the current measurement. The views that are available are specific to the current measurement selected under the **Meas** key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below. For more information about common functions, refer to Analyzer Setup.

Key Path	**Front panel key**

Display

Invoke Display menu. All measurements have same Display menu and same functionality for each key under Display menu. Refer to Analyzer Setup for more information.

Change Title

Displays menu keys that enable you to change or clear a title on your display.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:ANNotation:TITLe:DATA <string>`
	`:DISPlay:TXPower:ANNotation:TITLe:DATA?`
Example	DISP:TXP:ANN:TITL:DATA “Burst Power”
	DISP:TXP:ANN:TITL:DATA?
Preset	SA: Burst Power
	GSM, TD-SCDMA: Transmit Power
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Bar Graph

Allows the user to select visible/invisible Bar Graph.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:BARGraph[:STATe] ON|OFF|1|0`
	`:DISPlay:TXPower:BARGraph[:STATe]?`
Example	DISP:TXP:BARG ON
	DISP:TXP:BARG?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement. This key is the same for all measurements. Some of the Trace/Detector softkeys are unique, and they are described below. Most functions are common. Refer to Analyzer Setup for information on these functions.

Key Path	**Front panel key**

Max Hold Trace

This key allows the user to select visible/invisible Max Hold Trace.

Mode	SA, GSM, TD-SCDMA
Remote Command	`DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0`
	`DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	DISP:TXP:VIEW:WIND:TRAC:MAXH ON
	DISP:TXP:VIEW:WIND:TRAC:MAXH?
Dependencies/Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MAXimum forces this parameter to ON.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Min Hold Trace

This key allows the user to select visible/invisible Min Hold Trace.

Mode	SA, GSM, TD-SCDMA
Remote Command	`DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0`
	`DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`
Example	DISP:TXP:VIEW:WIND:TRAC:MINH ON
	DISP:TXP:VIEW:WIND:TRAC:MINH?
Dependencies/Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MINimum forces this parameter to ON.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Trigger

Trigger setup parameters are mode global, so this section describes trigger source selection in this measurement. Refer to Measurement Functions for more information about global trigger functions.

Key Path	**Front panel key**

Trig Source

Allow you to choose a trigger source.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:TRIGger:TXPower[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:TXPower[:SEQuence]:SOURce?`
Example	TRIG:TXP:SOUR IMM TRIG:TXP:SOUR?
Dependencies/Couplings	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
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SA, GSM: RFBurst TD-SCDMA: EXTernal
State Saved	Saved in instrument state.
Range	Free Run | Video | Line | External 1 | External 2 | RF Burst(Wideband) | Periodic Timer(Frame Trigger)
Key Path	**Trigger**

KEY:Free Run SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (Also called free run.)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input.
KEY:RF Burst SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer to generate a trigger signal.

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.

If the mode is TD-SCDMA, this function will NOT be available.

Key Path	**Front panel key**

Res BW

Sets the resolution bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:TXPower:BANDwidth[:RESolution]?`
Example	:TXP:BAND 1000
	:TXP:BAND?
Remote Command Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GSM: 510 kHz
	SA: 3 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Key Path	**BW**

RBW Control

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:BANDwidth:TYPE GAUSsian|FLATtop`
	`[:SENSe]:TXPower:BANDwidth:TYPE?`
Example	:TXP:BAND:TYPE GAUS
	:TXP:BAND:TYPE?
Restriction and Notes	This chooses the type of filter, either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. We are not interested in trading off time domain accuracy vs. noise, just total power accuracy vs. noise level in this measurement. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.
	FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy.
	GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
Remote Command Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Key Path	**BW**

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep for the current measurement. Many of the lower-level softkeys are also the same. For more information about these common functions, refer to Measurement Functions.

Key Path	**Front panel key**

Sweep Time (for SA and TD-SCDMA Mode)

Sets the sweep time to capture and show on screen.

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	SA, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <time>` `[:SENSe]:TXPower:SWEep:TIME?`
Example	:TXP:SWE:TIME 10s :TXP:SWE:TIME?
Dependencies/Couplings	TD-SCDMA: Coupled with Analysis Timeslot
Remote Command Notes	You must be in the Spectrum Analyzer mode or TD-SCDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SA: 640 us TD-SCDMA: 775.0us
State Saved	Saved in instrument state.
Min	1.0e–6
Max	50
Key Path	**Sweep/Control**

Sweep Time (for GSM Mode)

Sets the number of slots which are used in each data acquisition. Each slot is

approximately to 600 s.

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	GSM
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <integer>` `[:SENSe]:TXPower:SWEep:TIME?`
Example	:TXP:SWE:TIME 4 :TXP:SWE:TIME?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	50
Key Path	**Sweep/Control**

Meas Setup

Displays the setup menu for the currently selected measurement. Many of the lower-level menu keys operate the same in all measurements.. Unique functions are described below. For more information, refer to Analyzer Setup.

Key Path	**Front panel key**

Avg/Hold Num

Used to specify the number of data acquisition that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

OnSets measurement averaging on.

OffSets measurement averaging off.

Mode	SA, GSM, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:COUNt <integer>`
	`[:SENSe]:TXPower:AVERage:COUNt?`
	`[:SENSe]:TXPower:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:TXPower:AVERage[:STATe]?`
Example	TXP:AVER:COUN 100
	TXP:AVER:COUN?
Remote Command Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	50
	ON
State Saved	Saved in instrument state.
Min	1
Max	10000

Key Path	**Meas Setup**
BAF Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage[:STATe]
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:COUNt

Avg Mode

Used 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.

KEY:Exponential SCPI:EXPonential	After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.
KEY:Repeat SCPI:REPeat	After reaching the average count, the averaging is reset and a new average is started.

Mode	SA, GSM, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:TXPower:AVERage:TCONtrol?`
Example	TXP:AVER:TCON REP TXP:AVER:TCON?
Remote Command Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**
Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:TCONtrol

Avg Type

Used to specify the type of trace and result averaging to use.

This parameter is valid only for Measure Trace.

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	The maximum values are retained during the averaging cycle.
KEY:None SCPI:MINimum	The minimum values are retained during the averaging cycle.

SA, GSM

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:AVERage:TYPE LOG|MAXimum|MINimum|RMS` `[:SENSe]:TXPower:AVERage:TYPE?`
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Restriction and Notes	Maximum | Minimum are selected only via SCPI.
Dependencies/Couplings	Selecting MAXimum | MINimum force to visible Max Hold Trace or | and Min Hold Trace. Measure Trace stays in RMS or Video average state.
Remote Command Notes	You must be in the Spectrum Analyzer or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) | Log-Pwr Avg(Video) | Maximum | Minimum
Key Path	**Meas Setup**

Backwards Compatibility SCPI	[:SENSe]:BPOWer:AVERage:TYPE

TD-SCDMA

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:TYPE LOG|RMS` `[:SENSe]:TXPower:AVERage:TYPE?`
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Remote Command Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg(Video)
Key Path	**Meas Setup**

Threshold Lvl

If Meas Method is set to Above Threshold Lvl, the mean carrier power is calculated based on the trace above the threshold level. The threshold level would be described in dB (relative to the measured carrier) or dBm (absolute).

A green line in the grid would be displayed at the y-position associated with the current threshold level value. Its state would be controlled by On/Off state of the 'Display Line' under View/Display menu.

Mode	SA, GSM, TD-SCDMA

Remote Command	`[:SENSe]:TXPower:THReshold <real>`
	`[:SENSe]:TXPower:THReshold?`
	`[:SENSe]:TXPower:THReshold:TYPE ABSolute|RELative`
	`[:SENSe]:TXPower:THReshold:TYPE?`

Example	TXP:THR 0 TXP:THR?
Example	TXP:THR:TYPE ABS TXP:THR:TYPE?
Remote Command Notes	You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode. BAF SCPI Command determines whether this command is setting an absolute or a relative power level. Since absolute (dBm) and relative (dB) value are supported, positive input value for relative will be truncated to zero. Example: If Threshold Level = 5 dBm with Threshold Type = Absolute, changing Threshold Type to Relative changes Threshold Level to Zero. Suffix dB and dBm are allowed, but it does not change the state of Threshold Type. Suffix may not be send. You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GSM: –20.0 SA: –30.0 TD-SCDMA : –60.0 RELative
State Saved	Saved in instrument state.
Min	–100
Max	GSM, SA: 100 TD-SCDMA: Relative : 0dB Absolute : 60dBm
Key Path	**Meas Setup**
BAF Backwards Compatibility SCPI	[:SENSe]:BPOWer:THReshold:TYPE
Backwards Compatibility SCPI	[:SENSe]:BPOWer:THReshold

Meas Method

There are two selections for this parameter; Above Threshold Level, and Measured Burst Width.

Above Threshold Level measurement algorithm is used to capture a time record, and average only those points in the time record that exceed the user-specified threshold level. No attempt is made to position the burst, or to calculate/display burst widths. This can be used to measure continuous signals, or bursted signals where the Measured Burst Width algorithm is too restrictive.

Measured Burst Width measurement algorithm uses the threshold level to calculate the burst center, and average those points that lie within a user-specified burst width that is centered upon the burst. The burst width parameter is described in more detail below.

If the mode is TD-SCDMA, there is a third selection.

Single Time Slot measurement algorithm is to capture a single time slot record, and calculate the start and stop position of the time slot in terms of the trigger position theoretically. No attempt is made to position the burst, or to calculate/display burst widths. The burst width drawn in the screen is considered to be the theoretical width of the slot. This method is recommended to measure the mean transmit power in a single slot when trigger source is External Front/Rear while the Measured Burst Width algorithm is too restrictive.

SA,GSM

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:METHod THReshold|BWIDth` `[:SENSe]:TXPower:METHod?`
Example	TXP:METH BWID TXP:METH?
Preset	THReshold
State Saved	Saved in instrument state.
Range	Above Threshold Lvl|Measured Burst Width
Key Path	**Meas Setup**
Backwards Compatibility SCPI	[:SENSe]:BPOWer:METHod

TD-SCDMA

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:METHod THReshold|BWIDth|SINGle` `[:SENSe]:TXPower:METHod?`
Example	TXP:METH BWID TXP:METH?
Preset	SINGle
State Saved	Saved in instrument state.
Range	Threshold Lvl | Measured Burst Width | Single TimeSlot
Key Path	**Meas Setup**

Burst Width

When Burst Width Mode is set to manual, the user may enter a fixed-time value in seconds, or alternatively specify the burst width as a percentage of the last measured burst width (result in bottom-left corner of second window).

Mode	SA, GSM, TD-SCDMA

Remote Command	`[:SENSe]:TXPower:BURSt:WIDTh <time>`
	`[:SENSe]:TXPower:BURSt:WIDTh?`
	`[:SENSe]:TXPower:BURSt:AUTO ON|OFF|1|0`
	`[:SENSe]:TXPower:BURSt:AUTO?`

Example	TXP:BURS:WIDT 10 TXP:BURS:WIDT?
Example	TXP:BURS:AUTO 0 TXP:BURS:AUTO?
Restriction and Notes	Burst Width will be grayed out if Meas Method is set to 'Above Threshold Lvl'.

Dependencies/Couplings	SA, GSM Max value depends on Sweep Time, Res BW and RBW filter type. TD-SCDMA: If the measure method is not “Measured Burst Width”, this key will be grayed out. The default value is depending on the Burst type: Burst Type = Traffic š Burst Width = 662.5us Burst Type = Downlink Pilot š Burst Width = 50us Burst Type = Uplink Pilot š Burst Width = 100us
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SA, GSM: 255.6 us TD-SCDMA: 662.5us ON
State Saved	Saved in instrument state.
Min	100.0 ns
Max	50 s
Key Path	**Meas Setup**
BAF Backwards Compatibility SCPI	[:SENSe]:BPOWer:BURSt:AUTO

IF Gain

The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Mode	SA
Key Path	**Meas Setup**

If the mode is TD-SCDMA, this function will NOT be available.

There is no 'IF Gain' supported in TD-SCDMA Transmit Power. The front-panel key will display a blank menu key when pressed.

IF Gain Auto

Activates the auto rules for IF Gain.

Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:IF:GAIN:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:TXPower:IF:GAIN:AUTO[:STATe]?`
Example	`TXP:IF:GAIN:AUTO ON`
	`TXP:IF:GAIN:AUTO?`
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed according to the following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Remote Command Notes	You must be in the Spectrum Analyzer mode, GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, More, IF Gain**

IF Gain State

Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:TXPower:IF:GAIN[:STATe]?`

Example	`TXP:IF:GAIN` ON `TXP:IF:GAIN?`
Dependencies/Couplings	Sending this command forces IF Gain Auto to OFF (Man).
Remote Command Notes	You must be in the Spectrum Analyzer mode, GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals) | High Gain (Best Noise Level)
Key Path	**Meas Setup, More, IF Gain**

Meas Interval (TD-SCDMA Mode Only)

Sets the number of slots to be captured for each measurement. Uplink and downlink pilots each count as one slot, so setting the Meas Interval parameter to 9 will display one full subframe.

Post Setup	! Set back to original Mode :INST:SEL [VAR_Mode]
Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <integer>` `[:SENSe]:TXPower:SWEep:TIME?`
Example	:TXP:SWE:TIME 4 :TXP:SWE:TIME?
Restriction and Notes	In Single Time Slot method, Meas Interval will be set to 1 and the key will be disabled automatically.

Dependencies/Couplings	When device in Radio menu changes: If device is BTS, Trigger Source: External Front, Method: Single Time Slot, Measure: Continuous, Measure Time: disabled (=1); If device is MS, Trigger Source: RF Burst, Method: Measured Burst Width, Measure: Single, Measure Time: enabled.
Remote Command Notes	You must be in the TDSCDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	18
Key Path	**Meas Setup, More**

Meas Preset

Returns parameters for this measurement to those set by the factory.

Mode	SA, GSM, TD-SCDMA
Remote Command	`:CONFigure:TXPower`
Example	CONF:TXP
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

See the "Marker Function" section for more information.

Key Path	**Front panel key**

Select Marker

Specifies the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode as described under **Normal**, **Delta**, **Fixed** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:TXP:MARK:MODE OFF
	CALC:TXP:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer[1] | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12:MODE

Marker X Axis Value

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:TXP:MARK3:X 0 CALC:TXP:MARK3:X?

Restriction and 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**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	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
Key Path	**Marker, Normal**
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X

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	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:TXP:MARK10:X:POS 500 CALC:TXP:MARK10:X:POS?

Restriction and 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**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TDSCMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	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:BPOWer:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y Axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`

Example	CALC:TXP:MARK11:Y?
Restriction and Notes	The query returns the marker Y Axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Backwards Compatibility SCPI	:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult? :CALCulate:BPOWer:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:RESult? :CALCulate:BPOWer:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Select Marker

Specifies the selected marker.

Mode	GSM, SA, TD-SCDMA
Key Path	**Marker, Properties**

Relative To

Selects the marker that the selected marker will be relative to (its reference marker).

Mode	GSM, SA, TD-SCDMA

Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:TXP:MARK:REF 10
	CALC:TXP:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
	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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|MAXHold|MINHold`
	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:TXP:MARK:TRAC MAXH
	CALC:TXP:MARK:TRAC?

Restriction and Notes	If Detector/Max Hold Trace is Off, Max Hold is grayed out and MAXHold parameter is not available. If Detector/Min Hold Trace is Off, Min Hold is grayed out and MINHold parameter is not available.
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope | Max Hold RF Envelope | Min Hold RF Envelope
Key Path	**Marker, Properties**
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:TXPower:MARKer:COUPle[:STATe]?`
Example	CALC:TXP:MARK:COUP ON CALC:TXP:MARK:COUP?
Remote Command Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer:AOFF`
Example	CALC:TXP:MARK:AOFF
Remote Command Notes	You must be in the Spectrum Analyzer mode, TDSDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**
Backwards Compatibility SCPI	:CALCulate:BPOWer:MARKer:AOFF

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.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:TXP:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no 'Marker To' functionality supported in Burst (Tx) Power so this front-panel key will display a blank menu key when pressed.

Key Path **Front panel key**

Marker Function

There is no ‘Marker Function’ supported in Burst (Tx) Power so this front-panel key will display a blank menu key when pressed.

Key Path **Front panel key**

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7 GMSK Power vs. Time

Power vs. Time measures the mean transmit power during the “useful part” of GSM bursts and verifies that the power ramp fits within the defined mask. Power vs. Time also lets you view the rise, fall, and “useful part” of the GSM bursts. Using the “Multi-Slot” function, up to eight slots in a frame can be viewed at one time.

Remote Command Results:

The following commands are used to retrieve the measurement results:

```
:CONFigure:PVTime

:CONFigure:PVTime:NDEFault

:INITiate:PVTime

:FETCh:PVTime[n]?

:READ:PVTime[n]?

:MEASure:PVTime[n]?
```

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

not specified or n = 1	Returns the following comma-separated scalar results: Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). Power of single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Start point of the useful part of the burst is the index of the data point at the start of the useful part of the burst Stop point of the useful part of the burst is the index of the data point at the end of the useful part of the burst Index of the data point where T0 occurred. Burst width of the useful part of the burst is the width of the burst measured at 3dB below the mean power in the useful part of the burst. Maximum value is the maximum value of the most recently acquired data (in dBm). Minimum value is the minimum value of the most recently acquired data (in dBm). Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values.
2	Returns comma-separated trace points of the entire captured I/Q trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points representing the upper mask (in dBm).
4	Returns comma-separated points representing the lower mask (in dBm).
7	Returns power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

9	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

10	Returns the following comma-separated scalar results: Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). Power of single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Start point of the useful part of the burst is the index of the data point at the start of the useful part of the burst Stop point of the useful part of the burst is the index of the data point at the end of the useful part of the burst Index of the data point where T0 occurred. Burst width of the useful part of the burst is the width of the burst measured at 3dB below the mean power in the useful part of the burst. Maximum value is the maximum value of the most recently acquired data (in dBm). Minimum value is the minimum value of the most recently acquired data (in dBm). Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. 1st Error point is the time (in second) which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure. If the limit passes, returned data has no meaning. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONEPower vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF). Note: The returned value in Sync (Synchronization Burst) is. 10 if (BN42, BN43..BN105) = (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1, 1,1,1,0,0,1,0,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1) 11 if (BN42, BN43..BN105) = (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,1,0,1, 1,1,1,0,1,0,0,0,1,1,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1) 12 if (BN42, BN43..BN105) = (1,1,1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0, 1,0,0,1,1,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0) The returned value in Access (Access Burst) is 20 if (BN8, BN9..BN48) = (0,1,0,0,1,0,1,1,0,1,1,1,1,1,1,1,1,0,0,1,1,0,0,1,1,0,1,0,1,0,1,0,1,0,0,0,1,1,1,1,0,0,0) 21 if (BN8, BN9..BN48) = (0,1,0,1,0,1,0,0,1,1,1,1,1,1,0,0,0,1,0,0,0,0,1,1,0,0,0,1,0,1,1,1,1,0,0,1,0,0,1,1,0,1)

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allow you to set the display X reference value by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**SPAN X Scale**

Ref Value (Burst view and Multi-slot view)

Allow you to set the display X reference value.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:PVT:VIEW:WIND:TRAC:X:RLEV 1s
	:DISP:PVT:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–65 us |–67 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s

Key Path	**SPAN X Scale**

Ref Value (Rise & Fall view)

Allow you to set the display X reference value.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:PVT:VIEW2:WIND2:TRAC:X:RLEV 1s :DISP:PVT:VIEW2:WIND2:TRAC:X:RLEV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s |542.8 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Key Path	**SPAN X Scale**

Scale/Div

Allow you to set the display X scale/division value by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**SPAN X Scale**

Scale/Div (Burst view and Multi-slot view)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:PVT:VIEW:WIND:TRAC:X:PDIV 1ms
	:DISP:PVT:VIEW:WIND:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	70.00us|84.00us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Scale/Div (Rise & Fall view)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:PVT:VIEW2:WIND2:TRAC:X:PDIV 1ms
	:DISP:PVT:VIEW2:WIND2:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	10.00us | 10.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Ref Position

Allows you to set the display reference position to Left, Center or Right for both Burst and Multi-slot view as well as Rise & Fall views.

Mode	GSM
Key Path	**SPAN X Scale**

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:PVT:VIEW:WIND:TRAC:X:RPOS LEFT
	:DISP:PVT:VIEW:WIND:TRAC:X:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT | LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Rise & Fall view)

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:PVT:VIEW2:WIND2:TRAC:X:RPOS LEFT
	:DISP:PVT:VIEW2:WIND2:TRAC:X:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENTer | CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Allows you to toggle the scale coupling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**SPAN X Scale**

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`

Example	:DISP:PVT:VIEW:WIND:TRAC:X:COUP OFF :DISP:PVT:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, X Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

Auto Scaling (Rise & Fall view)

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle ?`
Example	:DISP:PVT:VIEW2:WIND2:TRAC:X:COUP OFF :DISP:PVT:VIEW2:WIND2:TRAC:X:COUP?
Restriction and Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, X Auto Scaling automatically changes to Off. Behavior is the same as the “Scale Coupling” in PSA’s GSM.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allow you to set the absolute power reference by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**AMPTD Y Scale**

Ref Value (Burst view and Multi-slot view)

Allow you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV 5
	:DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10 dBm|0.00 dBm

State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Ref Value (Rise & Fall view)

Allow you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV 5
	:DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup

Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allow you to enter a numeric value to change the vertical display sensitivity by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**AMPTD Y Scale**

Scale/Div (Burst view and Multi-slot view)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:PVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Scale/Div (Rise & Fall view)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:PVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either Top, Center, or Bottom by Burst, Multi-slot and Rise & Fall views.

Mode GSM

Key Path **AMPTD Y Scale**

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to either Top, Center, or Bottom.

Mode GSM

Remote Command

```
:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom
```

```
:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
```

Example	:DISP:PVT:VIEW:WIND:TRAC:Y:RPOS CENT :DISP:PVT:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Ref Position (Rise & Fall view)

Allows you to set the display reference position to either Top, Center, or Bottom.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:RPOS CENT :DISP:PVT:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle Y axis auto scaling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Mode	GSM

Key Path	**AMPTD Y Scale**

Auto Scaling (Burst view and Mlti-slot view)

Allows you to toggle Y axis auto scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:PVT:VIEW:WIND:TRAC:Y:COUP 0
	:DISP:PVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Ref Position manually, this parameter is set to 'Off' automatically.
	Behavior is the same as the "Scale Coupling" in PSA's GSM.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

Auto Scaling (Rise & Fall view)

Allows you to toggle Y axis auto scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`

Example	:DISP:PVT:VIEW:WIND:TRAC:Y:COUP 0 :DISP:PVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Ref Position manually, this parameter is set to 'Off' automatically. Behavior is the same as the "Scale Coupling" in PSA's GSM.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:PVTime:ANNotation:TITLe:DATA <string>`
	`:DISPlay:PVTime:ANNotation:TITLe:DATA?`
Example	DISP:PVT:ANN:TITL:DATA “Agilent”
	DISP:PVT:ANN:TITL:DATA?
Preset	GMSK Power vs Time
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

The View/Display key accesses a menu that allows you to select the desired view of the measurement from the following selections:

Burst (SCPI: ALL) – views the entire burst of interest as determined by the current trigger source, burst sync, training sequence, and timeslot settings. To view a different burst of interest you must set these parameters for the selected timeslot. To view multiple slots use the Multi-Slot key described below.

Rise & Fall (SCPI: BOTH) – zooms in on the rising and falling portions of the burst

being tested.

Multi-Slot (SCPI: MSLot) – views the entire sweep as specified by the current Meas Time setting. Power levels for each active slot are listed in a table below the timeslot display. Also shown in the table under 1st Error Pt. is the point in time at which the signal level first exceeds the limit; to help identify the slot where a failure first occurs.

See also View Selection by number (SCPI only).

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[:SELect] ALL|BOTH|MSLot`
	`:DISPlay:PVTime:VIEW[:SELect]?`
Example	:DISP:PVT:VIEW:SEL ALL
	:DISP:PVT:VIEW:SEL?
Preset	ALL
State Saved	Saved in instrument state.
Range	Burst | Rise & Fall | Multi-Slot
Key Path	**View/Display**

View Selection by number (SCPI only)

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW:NSELect <integer>`
	`:DISPlay:PVTime:VIEW:NSELect?`
Example	:DISP:PVT:VIEW:NSEL 3
	:DISP:PVT:VIEW:NSEL?
Restriction and Notes	1: Burst
	2: Rise & Fall
	3: Multi-Slot
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1

Max	3

Limit Mask

This setting is used to show (On) or hide (off) the limit mask that is displayed on the graticule.

NOTE This does not affect any calculation taking place.

Mode	GSM
Remote Command	`:DISPlay:PVTime:LIMit:MASK OFF|ON|0|1`
	`:DISPlay:PVTime:LIMit:MASK?`
Example	:DISP:PVT:LIM:MASK 1
	:DISP:PVT:LIM:MASK?
Restriction and Notes	This parameter only hides or shows the limit mask line on the display. PASS/FAIL limit check would be done if Limit Test is set to On whether Limit Mask state is set to On or Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Trace/Detector

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Max Hold Trace

This key allows the user to visible/invisible Max Hold Trace.

Mode	GSM
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	:DISP:PVT:VIEW:WIND:TRAC:MAXH ON :DISP:PVT:VIEW:WIND:TRAC:MAXH?
Dependencies/Couplings	Selecting [:SENSe]:PVTime:AVERage:TYPE MAXimum | MXMinimum forces this parameter to ON.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Min Hold Trace

This key allows the user to visible/invisible Min Hold Trace.

Mode	GSM

Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`
Example	:DISP:PVT:VIEW:WIND:TRAC:MINH ON :DISP:PVT:VIEW:WIND:TRAC:MINH?
Dependencies/Couplings	Selecting [:SENSe]:PVTime:AVERage:TYPE MINimum | MXMinimum forces this parameter to ON.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Info BW

Set the information bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise, which reduces dynamic range and the accuracy of low level measurements.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:PVTime:BANDwidth[:RESolution]?`
Example	:PVT:BAND 1000
	:PVT:BAND?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	510 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Key Path	**BW**

Filter Type

Allows you to select the type of resolution bandwidth filter. Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results

Mode	GSM
Remote Command	`[:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE FLATtop|GAUSsian`
	`[:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE?`
Example	:PVT:BAND:TYPE GAUS
	:PVT:BAND:TYPE?
Restriction and Notes	This chooses the type of filter, either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. Even though they have a 5.5% wider noise bandwidth for the same –3 dB bandwidth as a flat top filter, that is only 0.23 dB more noise, and their step response is much cleaner and free of overshooting and ringing. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian | Flat
Key Path	**BW**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Set the number of bursts that are averaged. After the specified number of bursts (average counts), the averaging mode (termination control) setting determines the averaging action.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:AVERage:COUNt <integer>`
	`[:SENSe]:PVTime:AVERage:COUNt?`
	`[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:PVTime:AVERage[:STATe]?`
Example	:PVT:AVER:COUN 3
	:PVT:AVER:COUN?
	:PVT:AVER 1
	:PVT:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Key Path	**Meas Setup**

Avg Mode

Selects the type of termination control used for the averaging function. This selection only effects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Exponential averaging SCPI:EXPonential	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
Repeat averaging SCPI:REPeat	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:PVTime:AVERage:TCONtrol?`
Example	:PVT:AVER:TCON REP
	:PVT:AVER:TCON?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Avg Type

Selects the averaging type from the following:

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	Keeps track of the maximum values.
KEY:None SCPI:MINimum	Keeps track of the minimum values.
KEY:None SCPI:MXMinimum	Keeps track of the maximum and minimum values.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:AVERage:TYPE LOG|RMS|MAXimum|MINimum|MXMinimum[:SENSe]:PVTime:AVERage:TYPE?`
Example	:PVT:AVER:TYPE RMS :PVT:AVER:TYPE?
Restriction and Notes	Maximum | Minimum | Max&Min are removed from FP selections, are selected only via SCPI.
Dependencies/Couplings	Selecting MAXimum | MINimum | MXMinimum force to visible Max Hold Trace or | and Min Hold Trace. Measure Trace stays in RMS or Video average state.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS) | Log-Pwr Avg(Video)
Key Path	**Meas Setup**

Burst Sync

Pressing the Burst Sync key allows you to choose the source used to synchronize the measurement to the “T0” point of the GSM burst. The “T0” point is defined as the time point of the transition from bit 13 to bit 14 of the midamble training sequence for a given time slot. The Burst Search Threshold setting (in the Mode Setup keys under the Demod menu) applies to both Training Seq and RF Amptd. Pressing the Burst Sync key brings up a menu with some or all of the following choices:

Training Seq (SCPI: TSEQuence)

RF Amptd (SCPI: RFBurst)

None (SCPI: NONE)

Mode	GSM
Remote Command	`[:SENSe]:PVTime:BSYNc:SOURce TSEQuence|RFBurst|NONE`
	`[:SENSe]:PVTime:BSYNc:SOURce?`
Example	:PVT:BSYN:SOUR NONE
	:PVT:BSYN:SOUR?
Dependencies/Couplings	If the selected Burst Sync is “NONE”, the Timeslot Lenght soft key becomes active. Otherwise the key gray-out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd|None
Key Path	**Meas Setup**

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain

Mode	GSM
Remote Command	`[:SENSe]:PVTime:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:PVTime:IF:GAIN:AUTO[:STATe]?`
Example	:PVT:IF:GAIN:AUTO ON
	:PVT:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, More, IF Gain**

IF Gain State

Selects the range of IF gain.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:PVTime:IF:GAIN[:STATe]?`
Example	:PVT:IF:GAIN ON
	:PVT:IF:GAIN?
Dependencies/Couplings	Couple to IF Gain Auto force it to Man.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup, More, IF Gain**

Meas Time

Allows you to measure more than one timeslot. Enter a value in integer increments of "slots" with a range of 1 to 8. The actual measure time in µs is set somewhat longer than the specified number of slots, in order to view the complete burst.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:SWEep:TIME <integer>` `[:SENSe]:PVTime:SWEep:TIME?`
Example	:PVT:SWE:TIME 4 :PVT:SWE:TIME?
Restriction and Notes	The actual sweep time may be slightly larger than requiredSweepTime due to limited trace point resolution, this is a hardware dependency.
Dependencies/Couplings	Scale/Div of X scale of Multi Slot View varies according to this value. Scale/Div should be adjusted to show set meas time.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 Slot
State Saved	Saved in instrument state.
Min	1
Max	8
Key Path	**Meas Setup, More**

Limit Test

Turn on or off limit pass/fail testing. Doesn't affect limit line display.

Backward Compatibility SCPI	:PVT:LIM:TEST 0 :PVT:LIM:TEST?
Mode	GSM
Remote Command	`:CALCulate:PVTime:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:PVTime:LIMit:TEST[:STATe]?`
Example	:CALC:PVT:LIM:TEST ON :CALC:PVT:LIM:TEST?
Restriction and Notes	This is not the same as the Limit Mask – the measurement results are checked against the PVT Limit parameter to see if they meet the limit requirements if set to On. If set to Off, PASS/FAIL indicator on the Meas Bar goes blank.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Limit Mask

Allows you to set the Limit Mask type to Standard or Custom.

For custom, see also:

Lower Mask Absolute Amplitude Levels

Lower Mask Points

Lower Mask Relative Amplitude Levels

Lower Mask Time Points

Upper Mask Absolute Amplitude Levels

Upper Mask Points

Upper Mask Relative Amplitude Levels

Upper Mask Time Points

KEYStandard SCPISTANdard	The measurement algorithm uses standard-defined limit mask.
KEYCustom SCPICUSTom	The measurement algorithm uses user-defined custom limit mask.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:MASK:SELect STANdard|CUSTom`
	`[:SENSe]:PVTime:MASK:SELect?`
Example	:PVT:MASK:SEL STAN
	:PVT:MASK:SEL?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	STANdard
State Saved	Saved in instrument state.
Range	Std|Custm
Key Path	**Meas Setup, More**

Timeslot Length

Allows you to change how the limit mask applies for each slot when in a multi-slot measurement.

KEYAll 156.25 symb SCPIEVEN	The measurement algorithm generates limit mask with the same slot length. All slots have 156.25 symbol

KEY157/156 symb SCPIINTeger	The measurement algorithm generates limit mask for slot 0 and 4 with slot length 157 symbol. And, the algorithm generates limit mask for slot 1, 2, 3, 5, 6, 7 with slot length 156 symbol. Slot 0 here is simply the first slot in the captured data, not the absolute slot determined by training sequence number.

Mode	GSM
Remote Command	`[:SENSe]:PVTime:BSYNc:SLENgth EVEN|INTeger` `[:SENSe]:PVTime:BSYNc:SLENgth?`
Example	:PVT:BSYN:SLEN INT :PVT:BSYN:SLEN?
Dependencies/Couplings	This parameter is available only if the Limit Test type is None. Otherwise grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	INTeger
State Saved	Saved in instrument state.
Range	All 156.25 symb | 157/156 symb
Key Path	**Meas Setup, More**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:PVTime`
Example	:CONF:PVT
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Remote Commands

Lower Mask Absolute Amplitude Levels

Allows you to enter a power level for any mask line segment that requires an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined. As the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is lower than the specified absolute limit, then the value of the absolute limit is user for this segment. Therefore, if the absolute reference limit is set to a very low value, the calculated value of the reference limit will never be lower, and the specified relative limit is always used for the segment.

Every time point you define with PVT:MASK:LOW:TIME must have a power value defined in the same order.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute <real>, …`
	`[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute?`
Example	:PVT:MASK:LIST:LOW:ABS 0,–10,–60
	:PVT:MASK:LIST:LOW:ABS?
Dependencies/Couplings	Relative Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200,–200
State Saved	Saved in instrument state.
Min	–200 dBm
Max	100 dBm

Lower Mask Points

Queries the number of elements in the lower mask. This value is determined by the

number of time points entered by :PVT:MASK:LIST:LOW:TIME.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:LOWer:POINts?`
Example	PVT:MASK:LIST:LOW:POIN?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only.

Lower Mask Relative Amplitude Levels

Enter the relative power level for each horizontal line segment in the lower limit mask. There should be a power level for each time point entered using [:SENSe]:PVTime:MASK:LIST:LOWer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask has been defined, the Reference Power Level is the mid-point between these two limits at time T0.

Any portion of the signal that has no limit line segment defined for it defaults to a very low limit (–100dB relative to the reference power). This prevents the measurement from indicating a failure for that portion of the data.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:LOWer:RELative <rel_ampl>, …` `[:SENSe]:PVTime:MASK:LIST:LOWer:RELative?`
Example	:PVT:MASK:LIST:LOW:REL –200,–200 :PVT:MASK:LIST:LOW:REL?
Dependencies/Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200,–200
State Saved	Saved in instrument state.
Min	–200
Max	200

Lower Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the lower limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value, and each segment to the left of t0 reference point is a negative time value.

First enter positive values in sequence starting from t0, then negative values in sequence starting from t0.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:LOWer:TIME <seconds>, …` `[:SENSe]:PVTime:MASK:LIST:LOWer:TIME?`
Example	PVT:MASK:LIST:LOW:TIME 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1, 1,1,1,1,1 PVT:MASK:LIST:LOW:TIME?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1,–1
State Saved	Saved in instrument state.
Min	–1 s
Max	1 s

Upper Mask Absolute Amplitude Levels

Allows you to enter a power level for any mask line segment that requires an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined (This is the power level of the useful part of the burst, or midway between the upper/lower masks). Remember, as the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is higher than the specified absolute limit, then the value of the absolute limit is user for this segment. Therefore, if the absolute reference limit is set to a very low value (–200 dBm), the calculated value of the reference limit will never be lower, and the specified relative limit is always used for the segment.

Every time point you define with PVT:MASK:UPP:TIME must have a power value defined

in the same order.

Front Panel nit/Terminator Keys	dBm
Remote Command	`[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute <real>, …`
	`[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute?`
Example	PVT:MASK:LIST:UPP:ABS –200,–200,–58,–200,–200,–200,–200,–58,–200
	PVT:MASK:LIST:UPP:ABS?
Dependencies/Couplings	Relative Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200,–200
State Saved	Saved in instrument state.
Min	–200 dBm
Max	100 dBm

Upper Mask Points

Queries the number of elements in the upper mask. This value is determined by the number of time points entered by :PVT:MASK:LIST:UPP:TIME.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:UPPer:POINts?`
Example	PVT:MASK:LIST:UPP:POIN?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Query only.

Upper Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:PVTime:MASK:LIST:UPPer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average

power in the useful part of the data). When an upper and lower limit mask has been defined, the Reference Power Level is the mid-point between these two limits.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:UPPer:RELative <rel_ampl>, …` `[:SENSe]:PVTime:MASK:LIST:UPPer:RELative?`
Example	:PVT:MASK:LIST:UPP:REL 4,–32,–48,100,4,7,–25,–43,100 :PVT:MASK:LIST:UPP:REL?
Dependencies/Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	100,100
State Saved	Saved in instrument state.
Min	–200 dB
Max	200 dB

Upper Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the upper limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 is a negative time value.

First enter positive values in sequence starting from t0, then the negative values in sequence starting from t0.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you’ve defined a limit for all the measured data.

Remote Command	`[:SENSe]:PVTime:MASK:LIST:UPPer:TIME <seconds>, …` `[:SENSe]:PVTime:MASK:LIST:UPPer:TIME?`
Example	PVT:MASK:LIST:UPP:TIME 1,–1 PVT:MASK:LIST:UPP:TIME?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1,–1
State Saved	Saved in instrument state.

Min	–1 s
Max	1 s

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See Trigger in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Allow you to choose a trigger source. Trigger settings are measurement global. Refer to Mode functionality section for trigger settings.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst (Wideband) SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called 'frame clock') to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:PVTime[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:PVTime[:SEQuence]:SOURce?`
Example	:TRIG:PVT:SOUR IMM :TRIG:PVT:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run(Immediate) | Video | Line | External 1 | External 2 | RF Burst | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section.

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode to Normal, Delta or Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE POSition|DELTa|OFF`
	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE?`
Example	:CALC:PVT:MARK:MODE OFF
	:CALC:PVT:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X <real>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X?`
Example	:CALC:PVT:MARK3:X 0 :CALC:PVT:MARK3:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. 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: seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Meas Time parameter value.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition <integer>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition?`
Example	:CALC:PVT:MARK10:X:POS 0 :CALC:PVT:MARK10:X:POS?
Restrictions and 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**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :Y?`
Example	:CALC:PVT:MARK11:Y?
Restriction and Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only command
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Select Marker

Specified the selected marker.

Key Path	**Marker, Properties**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :REFerence <integer>`
	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :REFerence?`
Example	:CALC:PVT:MARK:REF 3
	:CALC:PVT:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	When queried a single value is 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe RFENvelope|UMASk|LMASk|MAXRfenvelop|MINRfenvelop` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe?`
Example	:CALC:PVT:MARK:TRAC LMAS :CALC:PVT:MARK:TRAC?
Restriction and Notes	Max Hold RF Envelop is only available when Max Trace is set to On. Min Hold RF Envelop is only available when Min Hold Trace is set to On. Otherwise, the menu keys are grayed out and the commands are unavailable.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope | Upper Mask | Lower Mask | Max Hold RF Envelope | Min Hold RF Envelope
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:PVTime:MARKer:COUPle[:STATe]?`
Example	:CALC:PVT:MARK:COUP ON :CALC:PVT:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:PVTime:MARKer:AOFF`
Example	:CALC:PVT:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

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.

Mode	GSM, SA
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MAXimum`
Example	CALC:TXP:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

8 GMSK Phase & Frequency

Phase and frequency error are the measures of modulation quality for GSM systems. Since GSM systems use relative phase to transmit information, the phase and frequency accuracy of the transmitter are critical to the systems' performance and ultimately affect range.

Mode	GSM
Key Path	**Meas**

Remote Command Results:

The following commands are used to retrieve the measurement results:

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

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

not specified or n = 1	Returns the following scalar results: The result depends on the Average Type setting (Maximum or Mean) if the average state is ON. The average type is a remote command only parameter. average type is: Maximum (default setting) : Detected Maximum value in average cycle Mean : Averaged value in average cycle RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. Trace bit 0 Decision Offset is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. Trace Sync Start is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. Trace Time Sample is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs. T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec.
2	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.

3	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal reference phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
4	Returns a series of floating point numbers that represent each sample in the log magnitude trace of the original time record. Each number represents a value (in dBm) of the time record.
5	Returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. 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 rms phase error, there are ten points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . 10th number = Q of the symbol 0 decision point 11th number = I of the symbol 1 decision point 12th number = Q of the symbol 1 decision point …. Nth number = Q of the symbol N decision point
6	Returns a series of logical values (0 or 1) that represent the demodulated bit value of the measured waveform. The first number is the symbol 0 decision point and there are 1 point per symbol. Therefore, decision points are at 0, 1, 2, etc.
7	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing Phase and Frequency Error. The tested results are changed between Maximum and Average. It depends on the Average Type (:PFER:AVER:TYPE) setting. 1. Test results of RMS Phase Error 2. Test results of Peak Phase Error 3. Test results of Frequency Error

8	Returns the following scalar results: Average RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the average of the individual rms phase error. Maximum RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the max hold number of the individual rms phase error. Average Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the average of the individual peak phase error. Maximum Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the max hold number of the individual peak phase error. Average Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst phase error. Maximum Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst maximum peak phase error. Average Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the average of the individual frequency error. Maximum Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the max hold number of the individual frequency error. Average I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the average of the individual IQ Offset. Maximum I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset Average T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the average of the T0 offset. Maximum T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the max hold number of the T0 offset. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set reference value by Phase Error and Phase Error w/Freq, and RF Envelope.

See also:

Ref Value (Phase Error and Phase Error w/Freq window)

Ref Value (RF Envelope window)

Mode	GSM
Key Path	**SPAN X Scale**

Ref Value (Phase Error and Phase Error w/Freq window)

Allow you to set the display X reference value for time axis 'bit'.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <real>`
	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:PFER:VIEW:WIND:TRAC:X:RLEV 1.5
	:DISP:PFER:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If 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.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is Bits.
Preset	0.5
State Saved	Saved in instrument state.
Min	0.000
Max	5000000.000
Key Path	**SPAN / X Scale**

Ref Value (RF Envelope window)

Allow you to set the display X reference value for time axis ‘sec’.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel ?`
Example	:DISP:PFER:VIEW:WIND3:TRAC:X:RLEV 1.5 :DISP:PFER:VIEW:WIND3:TRAC:X:RLEV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–64.4 us
State Saved	Saved in instrument state.
Min	–1.0 s
Max	10.0 s
Key Path	**SPAN / X Scale**

Scale/Div

Allows you to set the display X scale/division value using bits (Phase Error and Phase Error w/Freq) or time (RF Envelope)

See also:

Scale/Div (Phase Error and Phase Error w/Freq window)

Scale/Div (RF Envelope window)

Mode	GSM
Key Path	**SPAN X Scale**

Scale/Div (Phase Error and Phase Error w/Freq window)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <real>`
	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV 15
	:DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Bits.
Preset	14.7
State Saved	Saved in instrument state.
Min	1.000
Max	500000.0
Key Path	**SPAN / X Scale**

Scale/Div (RF Envelope window)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time>
	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?
Example	:DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV 1
	:DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	532.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**SPAN / X Scale**

Ref Position

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt
	:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?
Example	:DISP:PFER:VIEW:WIND2:TRAC:X:RPOS LEFT
	:DISP:PFER:VIEW:WIND2:TRAC:X:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.

Range	Left | Ctr | Right
Key Path	**SPAN / X Scale**

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:PFER:VIEW:WIND:TRAC:X:COUP ON :DISP:PFER:VIEW:WIND:TRAC:X:COUP?
Dependencies/Couplings	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN / X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set reference value, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

"Ref Value (Phase Error and Phase Error w/Freq window)" on page 505

"Ref Value (RF Envelope window)" on page 506

Mode	GSM
Key Path	**AMPTD Y Scale**

Ref Value (Phase Error and Phase Error w/Freq window)

Allow you to set the absolute degree reference.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:PFER:VIEW:WIND:TRAC:Y:RLEV 5 :DISP:PFER:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is Degree(s).
Preset	0.00
State Saved	Saved in instrument state.

Min	–36000.0
Max	36000.0
Key Path	**AMPTD Y Scale**

Ref Value (RF Envelope window)

Allow you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV 4
	:DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV?
Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Sets the Y scale per division on the display, using absolute degree (Phase Error and Phase

Error w/Freq) or absolute power (RF Envelope).

See also:

"Scale/Div (Phase Error and Phase Error w/Freq window)" on page 507

"Scale/Division (RF Envelope window)" on page 507

Mode	GSM
Key Path	**AMPTD Y Scale**

Scale/Div (Phase Error and Phase Error w/Freq window)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <real>`
	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:PFER:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:PFER:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	5.00
State Saved	Saved in instrument state.
Min	0.01
Max	360
Key Path	**AMPTD Y Scale**

Scale/Division (RF Envelope window)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV 10 :DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for

more information.

Key Path	**AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale, More**

Ref Position

Allows you to set the reference position.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:PFER:VIEW:WIND:TRAC:Y:RPOS TOP :DISP:PFER:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT | CENT | TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the auto scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]2|3:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0`
	`:DISPlay:PFERror:VIEW[1]:WINDow[1]2|3:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:PFER:VIEW:WIND:TRAC:Y:COUP ON
	:DISP:PFER:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Presel Center manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:PFERror:ANNotation:TITLe:DATA <string>`
	`:DISPlay:PFERror:ANNotation:TITLe:DATA?`
Example	DISP:PFER:ANN:TITL:DATA “EDGE EVM”
	DISP:PFER:ANN:TITL:DATA?
Preset	GMSK Phase & Frequency
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

You can select desired view of the measurement from the following:

I/Q Measured Polar Graph (SCPI: POLar) – Provides a view of numeric results and a polar vector graph.
Window 1: Numeric Results
Window 2: I/Q Polar Graph

I/Q Error (SCPI: ERRor) – Provides a combination view including
Window 1: Phase Error
Window 2: Phase Error with Freq
Window 3: RF Envelope

Window 4: Numeric Results
Any of these windows can be selected (using the Next Window key) and made full size (using the Zoom key).

Data Bits (SCPI: DBITs) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

See also:

View Selection by number (Remote Command Only)(Remote Command Only)

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[:SELect] POLar|ERRor|DBITs`
	`:DISPlay:PFERror:VIEW[:SELect]?`
Example	:DISP:PFER:VIEW ERR
	:DISP:PFER:VIEW?
Restriction and Notes	- POLar : I/Q Measured Polar Graph
	- ERRor : I/Q Error
	- DBITs : Data Bits
Dependencies/Couplings	View Selection by number must be coupled with this parameter value.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ERRor
State Saved	Saved in instrument state.
Range	I/Q Error | I/Q Measurerd Polar Graph | Data Bits
Key Path	**View/Display**

View Selection by number (Remote Command Only)

You can select desired view with view number.

1 : I/Q Measured Polar Graph (SCPI: 1) – Provides a view of numeric results and a polar vector graph.
Window 1: Numeric Results
Window 2: I/Q Polar Graph

2 : I/Q Error (SCPI: 2) – Provides a combination view including
Window 1: Phase Error
Window 2: Phase Error with Freq
Window 3: RF Envelope
Window 4: Numeric Results

Any of these windows can be selected (using the Next Window key) and made full size (using the Zoom key).

3 : Data Bits (SCPI: 3) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW:NSELect <integer>`
	`:DISPlay:PFERror:VIEW:NSELect?`
Example	:DISP:PFER:VIEW:NSEL 3
Restriction and Notes	1: I/Q Measured Polar Graph
	2: IQ Error
	3: Data Bits
Dependencies/Couplings	View Selection must be coupled with this parameter value.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	2
State Saved	Saved in instrument state.
Min	1
Max	3

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

Vector and Constellation (SCPI: VC)

Vector Only (SCPI: VECTor)

Constellation Only (SCPI: CONStln)

Mode	GSM
Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC|VECTor|CONStln`
	`:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?`
Example	:DISP:PFER:VIEW:WIND2:TRAC:POL VC
	:DISP:PFER:VIEW:WIND2:TRAC:POL?

Restriction and Notes	VC : Vect & Constln VECTor: Vector CONStln : Constellation
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln | Vector | Constellation
Key Path	**View/Display**

Bit Dots

This Allows you to toggle the bit dots between On and Off.

On: would turn on blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Off: would turn off blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Mode	GSM
Remote Command	`:DISPlay:PFERror:BDOTs[:STATe] ON|OFF|1|0` `:DISPlay:PFERror:BDOTs[:STATe]?`
Example	:DISP:PFER:BDOT ON :DISP:PFER:BDOT?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Trace/Detector

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Used specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On – Sets measurement averaging on.

Off – Sets measurement averaging off.

Mode	GSM
Remote Command	`[:SENSe]:PFERror:AVERage:COUNt <integer>`
	`[:SENSe]:PFERror:AVERage:COUNt?`
	`[:SENSe]:PFERror:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:PFERror:AVERage[:STATe]?`
Example	:PFER:AVER:COUN 4
	:PFER:AVER:COUN?
	:PFER:AVER OFF
	:PFER:AVER?
Dependencies/Couplings	When this value is changed, Avg State is set to On.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.

Min	1
Max	10000
Key Path	**Meas Setup**

Avg Mode

Allows you to choose either exponential or repeat averaging. This selection only effects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.

Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Mode	GSM
Remote Command	`[:SENSe]:PFERror:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:PFERror:AVERage:TCONtrol?`
Example	:PFER:AVER:TCON REP
	:PFER:AVER:TCON?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Burst Sync

Select the method of synchronizing the measurement to the bursts.

RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.

Training Sequence (TSEQuence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

Mode	GSM
Remote Command	`[:SENSe]:PFERror:BSYNc:SOURce RFBurst|TSEQuence`
	`[:SENSe]:PFERror:BSYNc:SOURce?`
Example	:PFER:BSYN:SOUR RFB
	:PFER:BSYN:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	RFAMplitude must be work as RFBurst.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd
Key Path	**Meas Setup**

IF Gain

Accesses a menu that controls the setting of the IF Gain function.

This function is an IF amplifier with approximately 10 dB of gain and enables you to take full advantage of the RF dynamic range of the analyzer. When it is turned on without an overload, the dynamic range is always better than when this function is off. The **IF Gain** key can be used to set the IF Gain function to Auto, On (the extra 10 dB), or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain

Mode	GSM
Remote Command	`[:SENSe]:PFERror:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:PFERror:IF:GAIN:AUTO[:STATe]?`
Example	:PFERror:IF:GAIN:AUTO ON
	:PFERror:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, More**

IF Gain State

Selects the range of IF gain.

Mode	GSM
Remote Command	`[:SENSe]:PFERror:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:PFERror:IF:GAIN[:STATe]?`
Example	:PFER:IF:GAIN ON
	:PFER:IF:GAIN?
Dependencies/Couplings	Couple to IF Gain Auto. IF Gain Auto force it to Man.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup, More, IF Gain**

Limits

Accesses a menu that enables you to set the Limit Test.

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

Limit Test

Turns on or off limit pass/fail testing.

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:PFERror:LIMit:TEST[:STATe]?`
Example	:CALC:PFER:LIM:TEST ON :CALC:PFER:LIM:TEST?
Restriction and Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Meas Setup, More, Limits**

RMS Phase Errors

Set the limit value for RMS Phase limit in degree by MS and BTS.

See also:

RMS Phase Error Limit for BTS.

RMS Phase Error Limit for MS.

Mode	GSM
Key Path	**Meas Setup, More, Limits**

RMS Phase Error Limit for BTS.

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:BTS:RPHase <real>`
	`:CALCulate:PFERror:LIMit:BTS:RPHase?`
Example	:CALC:PFER:LIM:BTS:RPH 10
	:CALC:PFER:LIM:BTS:RPH?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Key Path	**Meas Setup, Limits**

RMS Phase Error Limit for MS.

Mode	GSM

Remote Command	`:CALCulate:PFERror:LIMit:MS:RPHase <real>`
	`:CALCulate:PFERror:LIMit:MS:RPHase?`
Example	:CALC:PFER:LIM:MS:RPH 10
	:CALC:PFER:LIM:MS:RPH?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Key Path	**Meas Setup, Limits**

Peak Phase Errors

Set the limit value for Peak Phase limit in degree by MS and BTS.

See also:
Peak Phase Error Limit for BTS
Peak Phase Error Limit for MS

Mode	GSM
Key Path	**Meas Setup, More, Limits**

Peak Phase Error Limit for BTS

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:BTS:PPHase <real>`
	`:CALCulate:PFERror:LIMit:BTS:PPHase?`
Example	:CALC:PFER:LIM:BTS:PPH 10
	:CALC:PFER:LIM:BTS:PPH?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).

Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Key Path	**Meas Setup, Limits**

Peak Phase Error Limit for MS

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:MS:PPHase <real>`
	`:CALCulate:PFERror:LIMit:MS:PPHase?`
Example	:CALC:PFER:LIM:MS:PPH 10
	:CALC:PFER:LIM:MS:PPH?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Key Path	**Meas Setup, Limits**

Frequency Errors

See also:
“Freq Error Limit for BTS” on page 525
“Freq Error Limit for mBTS” on page 525
“Freq Error Limit for pBTS.” on page 526
“Freq Error Limit for MS” on page 526

Mode	GSM
Key Path	**Meas Setup, More, Limits**

Freq Error Limit for BTS

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:BTS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:BTS:FERRor?`
Example	:CALC:PFER:LIM:BTS:FERR 10
	:CALC:PFER:LIM:BTS:FERR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is ppm.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Key Path	**Meas Setup, Limits**

Freq Error Limit for mBTS

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:MBTS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:MBTS:FERRor?`
Example	:CALC:PFER:LIM:MBTS:FERR 10
	:CALC:PFER:LIM:MBTS:FERR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is ppm.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Key Path	**Meas Setup, Limits**

Freq Error Limit for pBTS.

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:PBTS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:PBTS:FERRor?`
Example	:CALC:PFER:LIM:PBTS:FERR 10
	:CALC:PFER:LIM:PBTS:FERR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is ppm.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Key Path	**Meas Setup, Limits**

Freq Error Limit for MS

Mode	GSM
Remote Command	`:CALCulate:PFERror:LIMit:MS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:MS:FERRor?`
Example	:CALC:PFER:LIM:MS:FERR 10
	:CALC:PFER:LIM:MS:FERR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is ppm.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100

Key Path	**Meas Setup, Limits**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:PFERror`
Example	:CONF:PFER
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See Triggers in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Enables you to choose a trigger source. Trigger settings are the same across all modes.

See Trigger in the "Measurement Functions" section for more information.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called 'frame clock') to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:PFERror[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:PFERror[:SEQuence]:SOURce?`
Example	TRIG:PFER:SOUR VID TRIG:PFER:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode..
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run (Immediate) | Video | Line | External 1 | External 2 | RF Burst | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section. (for example, Pause/Resume)

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.
See also:
Marker X Axis Value (Remote Command Only)
Marker X Axis Position (Remote Command Only)
Marker Y Axis Value (Remote Command Only)

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:PFER:MARK:MODE OFF
	:CALC:PFER:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:PFER:MARK3:X 0 :CALC:PFER:MARK3:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

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** or **Fixed** - 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	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:PFER:MARK10:X:POS 0 :CALC:PFER:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:PFERror:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. If ‘Polar’ is selected for Marker Trace, it returns the values of ‘I’ and ‘Q’ at the same time.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:PFER:MARK:REF 10
	:CALC:PFER:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	When queried a single value is returned (the specified marker number’s 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe PERRor|PFERror|RFENvelope|POLar`
	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:PFER:MARK:TRAC POL
	:CALC:PFER:MARK:TRAC?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	PERRor
State Saved	Saved in instrument state.
Range	IQ Polar | Phase Error | Phase Error w/Freq | RF Envelope
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:PFERror:MARKer:COUPle[:STATe]?`
Example	:CALC:PFER:MARK:COUP ON
	:CALC:PFER:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer:AOFF`
Example	:CALC:PFER:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

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.

If Marker Trace of selected marker is POL, peak search would not be performed.

Mode	GSM
Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:PFER:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

9 GMSK Output RF Spectrum

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement. Since GSM is a TDMA format, RF power is being switched on and off depending on whether the actual burst is being transmitted. The switching of power causes spectral splatter at frequencies other than that being transmitted by the carrier. Fast transitions in the time domain causes switching transients that have high frequency content associated with them. Excessive amounts of energy spilling into an adjacent frequency channel could interfere with signals being transmitted to other MS or BTS.

Mode	GSM
Key Path	**Meas**

Remote Command Results:

The following commands can be used to retrieve the measurement results:

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

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: Modulation spectrum power, dB Modulation spectrum power, dBm Switching transient power, dB Switching transient power, dBm

Multi-Offset	not specified or n = 1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: Negative offset(a) - power relative to carrier (dB) Negative offset(a) - absolute average power (dBm) Positive offset(a) - power relative to carrier (dB) Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) *(15 offsets) *(2 measurement types - modulation & switching) Carrier – modulation measurement values Offset 1 – modulation measurement values and so on ~ Offset 14 – modulation measurement values Carrier – switching transients measurement values Offset 1 – switching transients measurement values ~ Offset 14 – switching transients measurement values and so on This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: Frequency Offset frequency from carrier frequency Power in dBm delta from limit (dB) delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.
Multi-Offset or Swept	2	Nothing returns.

Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Returns NULL.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Returns NULL.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Returns NULL.
Multi-Offset	6	Relative level to the test limit, and test limit itself for both modulation and switching transient measurements. Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order: 1. Relative level to the test limit (dB) at the negative offset frequency 2. Relative level to the test limit (dB) at the positive offset frequency 3. Relative test limit used (dB) 4. Absolute test limit used (dBm) Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transients measurement results are 0.0. The total number of values returned is: 120 = (4 results / offset) * (15 offset frequencies) * (2 measurement types) Carrier (Offset A) – modulation measurement results Offset 1 (Offset B) - modulation measurement results . . . . . . Offset 14 (Offset O) - modulation measurement results Carrier (Offset A)– switching transients measurement results Offset 1 (Offset B) – switching transients measurement results . . . . . . Offset 14 (Offset O) – switching transients measurement results

Single Offset or Swept	6	Returns NULL.
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set the display X reference value.

Mode	GSM
Key Path	**Span X Scale**

Ref Value (RF Envelope window)

Allow you to set the display X reference value in the RF Envelope window..

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:X:RLEV 1s
	:DISP:ORFS:VIEW:WIND:TRAC:X:RLEV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset.
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.000 us
State Saved	Saved in instrument state.

Min	–1.00 s
Max	10.00 s
Key Path	**SPAN X Scale**

Ref Value (Spectrum window)

Allow you to set the display X reference value.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq>` `:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:ORFS:VIEW2:WIND:TRAC:X:RLEV 0 :DISP:ORFS:VIEW2:WIND:TRAC:X:RLEV?
Restriction and Notes	This parameter is only available when Meas Method is Swept.
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	935.2 MHz
State Saved	Saved in instrument state.
Min	Depends on instrument minimum frequency.
Max	Depends on hardware options and instrument maximum frequency
Key Path	**SPAN X Scale**

Scale/Div

Allows you to set the display X scale/division value.

Mode	GSM
Key Path	**Span X Scale**

Scale/Div (RF Envelope window)

Allow you to set the display X scale/division value in the RF Envelope window.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:X:PDIV 1ms
	:DISP:ORFS:VIEW:WIND:TRAC:X:PDIV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset.
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	57.600 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Scale/Div (Spectrum window)

Allow you to set the display X scale/division value in the Spectrum window.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq>`
	`:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:ORFS:VIEW2:WIND:TRAC:X:PDIV 1MHz
Restriction and Notes	This parameter is only available when Meas Method is Swept.

Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	360.000 kHz
State Saved	Saved in instrument state.
Min	100.000 kHz
Max	1.000 MHz
Key Path	**Span X Scale**

Ref Position

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:X:RPOS CENT
	:DISP:ORFS:VIEW:WIND:TRAC:X:RPOS?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT | CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:X:COUP 1 :DISP:ORFS:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, X Auto Scaling automatically changes to Off
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:Y:PDIV 2 db
	:DISP:ORFS:VIEW:WIND:TRAC:Y:PDIV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.

Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00 | 10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal

Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either 0(Top), 5(Center), or 10(Bottom).

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:Y:RPOS TOP :DISP:ORFS:VIEW:WIND:TRAC:Y:RPOS?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP|TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:ORFS:VIEW:WIND:TRAC:Y:COUP ON :DISP:ORFS:VIEW:WIND:TRAC:Y:COUP?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked
Dependencies/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 user sets a value either Ref Value or Scale/Div manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:ORFSpectrum:ANNotation:TITLe:DATA <string>`
	`:DISPlay:ORFSpectrum:ANNotation:TITLe:DATA?`
Example	DISP:ORFS:ANN:TITL:DATA “Agilent”
	DISP:ORFS:ANN:TITL:DATA?
Preset	GMSK Output RF Spectrum
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

There is no 'Trace/Detector' functionality supported in GMSK Output RF Spectrum so this front-panel key displays a blank menu key when pressed.

Mode	GSM
Key Path	**Front-panel key**

BW

There is no ‘BW’ functionality supported in GMSK Output RF Spectrum so this front-panel key displays a blank menu key when pressed.

Mode	GSM
Key Path	**Front-panel key**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On – Sets measurement averaging on.

Off – Sets measurement averaging off.

MIN?MAX?DEF Support	Yes
Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:AVERage:COUNt <integer>`
	`[:SENSe]:ORFSpectrum:AVERage:COUNt?`
	`[:SENSe]:ORFSpectrum:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:AVERage[:STATe]?`
Example	:ORFS:AVER:COUN 3
	:ORFS:AVER:COUN?
	:ORFS:AVER ON
	:ORFS:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	20
	ON
State Saved	Saved in instrument state.
Min	1

Max	10000
Key Path	**Meas Setup**

Meas Type

Selects the measurement type.

KEYMod & Switch SCPIMSWitching	performs both Modulation and Switching measurements.
KEYModulation SCPIMODulation	measures the spectrum due to the 0.3 GMSK modulation and noise.
KEYSwitching SCPISWITching	measures the spectrum due to switching transients (burst ramping).
KEYFull Frame Modulation (FAST) SCPIFFModulation	improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active. When Full Frame Modulation (FAST) is selected only the multi-offset measurement method can be used; therefore the Meas Method defaults to multi-offset and the key is grayed out, and the Single Offset feature is not available.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:TYPE MODulation|MSWitching|SWITching|FFModulation`
	`[:SENSe]:ORFSpectrum:TYPE?`
Example	:ORFS:TYPE MOD
	:ORFS:TYPE?

Dependencies/Couplings	When Meas Method is set to MULTiple and this parameter is set to MODulation, the "Switching Meas BWs" and "FastPeakDet" keys are grayed out. When Meas Method is set to MULTiple and this parameter is set to SWITching, the “Fast Avg” (under Meas Setup), “Modulation Meas BWs” (under Advanced), “Min Freq Using Direct Time (under Advanced) and “Mod Avg” (under Advanced) keys are grayed out. When Meas Method is set to MULTiple and this parameter is set to MSWitching, the “Fast Avg” (under Meas Setup) and “FastPeakDet” (under Advanced) keys are grayed out. When Meas Method is set to SINGle and this parameter is set to MODulation, the “Switching Meas BWs” key (under Advanced) is grayed out. When Meas Method is set to SINGle and this parameter is set to SWITching, the “Fast Avg” (under Meas Setup), “Modulation Meas BWs” (under Advanced) and “Mod Avg” (under Advanced) keys are grayed out. When Meas Method is set to SINGle and this parameter is set to MSWitching, the “Fast Avg” (under Meas Setup) is grayed out. When Meas Method is set to SWEpt, the “Mod & Switch” (under Meas Type) and “Full Frame Mod(FAST)” (under Meas Type) keys are grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When Meas Method is set to SWEPt, parameter except for MODulation and SWITching would be ignored. When Meas Method is set except for MULTiple, parameter FFModulation would be ignored.
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch | Modulation | Switching | Full Frame Mod (FAST)
Key Path	**Meas Setup**

Meas Method

Used to select the measurement method.

KEYMulti-Offset SCPIMULTiple	the measurement is done at all offsets in the offset frequency list.
KEYSingle Offset (Examine) SCPISINGle	the measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
KEYSwept SCPISWEPt	the measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:MEASure MULTiple|SINGle|SWEPt` `[:SENSe]:ORFSpectrum:MEASure?`
Example	:ORFS:MEAS SING :ORFS:MEAS?
Dependencies/Couplings	When MULTiple is set, the following keys are grayed out. Single Offset Freq (Meas Setup) Wideband Noise (Meas Setup) Ref Pwr Avg (Advanced) When SINGle is set, the following keys are grayed out. Multi Offset Freq List (Meas Setup) Wideband Noise (Meas Setup) Min Freq Using Direct Time (Advanced) When SWEpt is set, the following keys are grayed out. Multi Offset Freq List (Meas Setup) Single Offset Freq (Meas Setup) Coupled with Select Modulation Method. See Remarks.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When Meas Type is set to MSWitching, SWEPt would be ignored. When Meas Type is set to FFModulation, SINGle and SWEPt would be ignored. When MULTiple is set, “Select Modulation Method” is forced to DISCrete. When SWEPt is set, “Select Modulation Method” is forced to SWEep. When “Select Modulation Method” is set to DISCrete, this parameter is forced to MULTiple. When “Select Modulation Method” is set to SWEep and Meas Type is set to Modulation or Switching, this parameter is forced to SWEpt
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset | Single Offset (Examine) | Swept
Key Path	**Meas Setup**

Multi-Offset Freq List

Accesses a menu to chose the offset frequency list. Select a Standard, Short, or Custom list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the ORFS measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the ORFS measurement.

- CUSTom – uses the four user-defined lists that specify:
  - Offset frequencies for modulation spectrum measurement
  - Corresponding resolution bandwidths for each of the modulation offset frequencies
  - Offset frequencies for switching transient spectrum measurement
  - Corresponding resolution bandwidths for each of the switching transient offset frequencies

  SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the :SENSe:ORFSpectrum subsystem.

  STANdard - the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the :SENSe:ORFSpectrum subsystem.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:SELect CUSTom|SHORt|STANdard`
	`[:SENSe]:ORFSpectrum:LIST:SELect?`
Example	:ORFS:LIST:SEL CUST
	:ORFS:LIST:SEL?
Restriction and Notes	This softkey available only when Meas Method is set to 'Multi-Offset'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SHORt
State Saved	Saved in instrument state.
Range	Standard | Short | Custom
Key Path	**Meas Setup**

Single Offset Freq

Used to select a frequency offset from the carrier at which to perform a single offset Output RF Spectrum measurement.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:OFRequency <freq>`
	`[:SENSe]:ORFSpectrum:OFRequency?`
Example	:ORFS:OFR 250 kHz
	:ORFS:OFR?
Restriction and Notes	This softkey available only when Meas Method is set to 'Single Offset (Examine)'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	–12.0 MHz
Max	+12.0 MHz
Key Path	**Meas Setup**

Wideband Noise

Set wideband noise function to ON or OFF. When set to Off, the analyser is turned to the carrier and –1800 kHz to +1800 kHz either side of the center frequency is swept. When set to On, the whole of the relevant band +2 MHz either side is swept.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:WBNoise ON|OFF|1|0`
	`[:SENSe]:ORFSpectrum:WBNoise?`
Example	:ORFS:WBN ON
	:ORFS:WBN?
Dependencies/Couplings	This key available only when Meas Method is 'Swept'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

Fast Avg

Used to change On/Off state of Fast Avg.

Fast Average is active only when averaging is on, and when only the modulation results are being measured. If both modulation and switching transients results are being measured, then the measurement uses the default averaging.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe] OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe]?`
Example	:ORFS:AVER:FAST ON
	:ORFS:AVER:FAST?
Dependencies/Couplings	This key is available when 'Modulation' is selected on Meas Type and Meas Method is not SWEPt. Otherwise grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Dependencies/Couplings	The advanced menu is not available when Meas Method is Swept and the Advanced key is blanked.

Key Path	**Meas Setup, More**

Modulation Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (for Modulation Meas BWs)
- <1800 kHz Offset RBW (for Modulation Meas BWs)
- >= 1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when Meas Type is Switching or Multi-Offset Freq List Freq List is Custom.

Key Path	**Meas Setup, More, Advanced**

Carrier RBW (for Modulation Meas BWs) Set the resolution bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:CARRier <freq>`
	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:CARRier?`
Example	:ORFS:BAND:MOD:CARR 30e3
	:ORFS:BAND:MOD:CARR?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Dependencies/Couplings	No
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz

Key Path	**Meas Setup, More, Advanced, Modulation Meas BWs**

< 1800 kHz Offset RBW (for Modulation Meas BWs) Set the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies less than 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>`
	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?`
Example	:ORFS:BAND:MOD:OFFS:CLOS 30 kHz
	:ORFS:BAND:MOD:OFFS:CLOS?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Meas BWs**

>= 1800 kHz Offset RBW (for Modulation Meas BWs) Set the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR <freq>`
	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`
Example	:ORFS:BAND:RES:MOD:OFFS:FAR 30 kHz
	:ORFS:BAND:RES:MOD:OFFS:FAR?

Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Meas BWs**

Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (for Modulation Meas BWs)
- <1800 kHz Offset RBW (for Modulation Meas BWs)
- >= 1800 kHz Offset RBW (for Modulation Meas BWs)
- VBW:3dB RBW (for Switching Meas BWs) – information only. Bandwidth ratio is fixed at 3.

This menu key is grayed out when Meas Type is Modulation or Full Frame Mod, or when Multi-Offset Freq List Freq List is Custom.

Key Path	**Meas Setup, More, Advanced**

Carrier RBW (for Switching Meas BWs) Set the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:CARRier <freq>`
	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:CARRier?`
Example	:ORFS:BAND:SWIT:CARR 30e3
	:ORFS:BAND:SWIT:CARR?

Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

< 1800 kHz Offset RBW (for Switching Meas BWs) Sets the resolution bandwidth used for the spectrum due to switching transients part of the ORFS measurement for offset frequencies less than 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?`
Example	:ORFS:BAND:RES:SWIT:OFFS:CLOS 30 kHz :ORFS:BAND:RES:SWIT:OFFS:CLOS?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

>= 1800 kHz Offset RBW (for Switching Meas BWs) Sets the resolution bandwidth used for the spectrum due to switching transients part of the ORFS measurement for offset

frequencies greater than or equal to 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>`
	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?`
Example	:ORFS:BAND:RES:SWIT:OFFS:FAR 30e3
	:ORFS:BAND:RES:SWIT:OFFS:FAR?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

Modulation Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Modulation | Full Frame Mod
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, More, Advanced**

Offset Selects the offset pairs (upper and lower) that affect the menu keys and displays the momery selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter

selection at a time is shown on this menu key label.

Key Path	**Meas Setup, More, Advanced**

Offset Freq This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency.

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Its default value is ON (1) in order to keep background compatibility. Previously, without this parameter, measurement was done on all the specified frequencies by Custom Modulation Offset Freq.

Mode	GSM

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency]?`
	`[:SENSe]:ORFSpectrum:LIST:MODulation: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:ORFSpectrum:LIST:MODulation:STATe?`

Example	:ORFS:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5 :ORFS:LIST:MOD:FREQ? :ORFS:LIST:MOD:STAT ON, ON, ON :ORFS:LIST:MOD:STAT?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Res BW Define the custom set of resolution bandwidths for the modulation spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth?`
Example	:ORFS:LIST:MOD:BAND 10e3,10e3,10e3 :ORFS:LIST:MOD:BAND?
Remote Command Notes	This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with :SENS:ORFS:LISE:SEL CUST. You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.
Preset	3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,1.000000000E+05,1.000000000E+05,1.000000000E+05,1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Rel Limit Level Offset Defines the custom set of level offsets for the modulation spectrum

part of the ORFS measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset[:RCARrier]?`
Example	:ORFS:LIST:MOD:LOFF:RCAR 0.0, –2.0, –5.0 :ORFS:LIST:MOD:LOFF:RCAR?
Restriction and Notes	The menu key is grayed out when Offset is A. The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Abs Limit Level Offset This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the ORFS measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Mode	GSM

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset:ABSolute <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset:ABSolute?`
Example	:ORFS:LIST:MOD:LOFF:ABS 0.0, –2.0, –5.0 :ORFS:LIST:MOD:LOFF:ABS?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Apply Level Offset

KEYRel SCPIRELative	Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. Standard-defined modulation relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

KEYAbs SCPIABSolute	Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. Standard-defined modulation absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:ORFSpectrum:LIST:MODulation:APPLy?`
Example	:ORFS:LIST:MOD:APPL REL, REL, REL :ORFS:LIST:MOD:APPL?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel | Both | Abs
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Switching Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset

- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, More, Advanced**

Offset Freq

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Its default value is ON (1), in order to maintain background compatibility.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency]?`
	`[:SENSe]:ORFSpectrum:LIST:SWITching: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:ORFSpectrum:LIST:SWITching:STATe?`
Example	:ORFS:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5
	:ORFS:LIST:SWIT:FREQ?
	:ORFS:LIST:SWIT:STAT ON, ON, ON
	:ORFS:LIST:SWIT:STAT?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Res BW Defines the custom set of resolution bandwidths for the switching transient spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth?`
Example	:ORFS:LIST:SWIT:BAND 1e3,1e3,1e3,1e3 :ORFS:LIST:SWIT:BAND?
Remote Command Notes	This command is only valid if :SENS:ORFS:MEAS is set to multiple and the custom list type is selected with :SENS:ORFS:LISE:SEL CUST. You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.
Preset	3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Rel Limit Level Offset Defines the custom set of level offsets for the switching transient spectrum part of the ORFS measurement. This allows you to modify the standard limits by

adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset[:RCARrier]?`
Example	:ORFS:LIST:SWIT:LOFF:RCAR 0.0, –2.0, –5.0 :ORFS:LIST:SWIT:LOFF:RCAR?
Restriction and Notes	The menu key is grayed out when Offset is A. The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Abs Limit Level Offset This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the ORFS measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Mode	GSM

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset:ABSolute?`
Example	:ORFS:LIST:SWIT:LOFF:ABS 0.0, –2.0, –5.0 :ORFS:LIST:SWIT:LOFF:ABS?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Apply Level Offset

KEYRel SCPIRELative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

KEYAbs SCPIABSolute	Only Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. Standard-defined switching absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:ORFSpectrum:LIST:SWITching:APPLy?`
Example	:ORFS:LIST:SWIT:APPL REL, REL, REL :ORFS:LIST:SWIT:APPL?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel | Both | Abs
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Min Freq Using Direct Time

Selects the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and is faster for measuring at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz). It is much faster for measuring at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the Direct Time method does not. The use of 5-pole

sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:BFRequency <freq>`
	`[:SENSe]:ORFSpectrum:BFRequency?`
Example	:ORFS:BFR 600e3
	:ORFS:BFR?
Dependencies/Couplings	This softkey is grayed out unless Meas Method is set to MULTiple and Meas Type is set to MSWitching or MODulation.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	2MHz
Key Path	**Meas Setup, More, Advanced**

Fast Peak Det

Sets the detection mode to “fast peak”.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:DETector:SWITching:FAST[:STATe] ON|OFF|1|0`
	`[:SENSe]:ORFSpectrum:DETector:SWITching:FAST[:STATe]?`
Example	:ORFS:DET:SWIT:FAST ON
	:ORFS:DET:SWIT:FAST?
Dependencies/Couplings	This key is active when Meas Type is ‘Switching’ and Meas Method is ‘Multi-Offset’. Otherwise grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More, Advanced**

Ref Pwr Avg

Specifies how many averages to use when measuring the reference power.

Set it to ON to use the same number of averages as specified in the number of bursts averaged command.

Set it to OFF to use the number specified in the reference power averages command.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt <integer>`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt?`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO] ON|OFF|1|0`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO]?`
Example	:ORFS:REF:AVER:COUN 10
	:ORFS:REF:AVER:COUN?
	:ORFS:REF:AVER OFF
	:ORFS:REF:AVER?
Restriction and Notes	This softkey is grayed out unless Meas Method is set to Single Offset.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	ON
State Saved	Saved in instrument state.
Range	1 to 1000
Key Path	**Meas Setup, More, Advanced, More**

Mod Avg

Select the type of averaging for measuring the modulation spectrum. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

KEYLog-Pwr Avg (Video) SCPILOG	The log of the power is averaged. (This is also known as video averaging.)
KEYPwr Avg (RMS) SCPIRMS	The power is averaged, providing the rms of the voltage.

Mode	GSM
Remote Command	`[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE LOG|RMS` `[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE?`
Example	:ORFS:AVER:MOD:TYPE LOG :ORFS:AVER:MOD:TYPE?
Restriction and Notes	This softkey is grayed out when Meas Type is set to Switching.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LOG
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Key Path	**Meas Setup, More, Advanced, More**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:ORFSpectrum`
Example	:CONF:ORFS

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Trigger

Accesses menu functions that enable you to select and control the trigger source for the current measurement. See Trigger in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Allow you to choose a trigger source. Trigger settings are mode global. Refer to Mode functionality section for trigger settings.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst (Wideband) SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called ‘frame clock’) to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:ORFSpectrum[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:ORFSpectrum[:SEQuence]:SOURce?`
Example	TRIG:ORFS:SOUR EXT TRIG:ORFS:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Parameter 'IF' is an alias of 'VIDeo', would be coupled each other.
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run(Immediate) | Video | Line | External 1 | External 2 | RF Burst(Wideband) | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section. (for example, Pause/Resume)

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:ORFS:MARK:MODE OFF
	:CALC:ORFS:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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** or **Fixed**.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:ORFS:MARK3:X 0 :CALC:ORFS:MARK3:X?

Restriction and Notes	If no suffix is sent it, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max/Min value would be changed by Sweep Time or Frequency Span.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37.
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:ORFS:MARK10:X:POS 0 :CALC:ORFS:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.

Dependencies/Couplings	Max/Min value would be changed by Sweep Time or Frequency Span.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:ORFS:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0

State Saved	No

Properties

Accesses a menu that allow you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:ORFS:MARK:REF 5 :CALC:ORFS:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried, a single value is returned (the specified marker number’s 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFEMod|RFESwitching|SPEMod|LIMMod` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:ORFS:MARK:TRACE RFES :CALC:ORFS:MARK:TRACE?
Restriction and Notes	RF Envelope Modulation and RF Envelop Switching are available only when Meas Mothod is Single. Swp Spectrum Modulation and Limit Modulation are available when Meas Method is Swept. Otherwise they are grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation | RF Envelope Switching | Swp Spectrum Modulation | Limit Modulation
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM

Remote Command	`:CALCulate:ORFSpectrum:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ORFSpectrum:MARKer:COUPle[:STATe]?`
Example	:CALC:ORFS:MARK:COUP ON :CALC:ORFS:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer:AOFF`
Example	:CALC:ORFS:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

Peak Search

Pressing Peak Search front-panel key performs a peak search and opens this Peak Search menu. Peak Search places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	GSM
Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`:CALC:ORFS:MARK2:MAX`
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

10 GMSK TX Band Spur

This measurement checks that the transmitter does not transmit undesirable energy into the transmit band. This energy may cause interference for other users of the GSM system.

This measurement is only available for the base station. The transmitter should be set at its maximum output power on all time slots.

Remote Command Results:

The following commands are used to retrieve the measurement results:

```
:CONFigure:TSPur

:CONFigure:TSPur:NDEFault

:INITiate:TSPur

:FETCh:TSPur[n]?

:READ:TSPur[n]?

:MEASure:TSPur[n]?
```

n	Results Returned
not specified or n = 1	Returns 3 comma-separated scalar results: The worst spur's frequency difference from channel center frequency (in MHz) The worst spur's amplitude difference from the limit (in dB) The worst spur's amplitude difference from the mean transmit power (in dB)
2	Returns trace of the current segment spectrum.
3	Returns trace of the current segment Upper Limit.
4	Returns trace of Lowest segment Spectrum.
5	Returns trace of Lowest segment Upper Limit.
6	Returns trace of Lower Adj segment Spectrum.
7	Returns trace of Lower Adj segment Upper Limit.
8	Returns trace of Upper Adj segment Spectrum.
9	Returns trace of Upper Adj segment Upper Limit.
10	Returns trace of Highest segment Spectrum.
11	Returns trace of Highest segment Upper Limit.

12	1. The mean transmit power. 2. The spur's frequency offset from channel center frequency (in MHz) on Lowest region. 3. The spur's amplitude difference from the limit (in dB) on Lowest region. 4. The spur's amplitude difference from the mean transmit power (in dBc) on Lowest region. 5. The spur's frequency offset from channel center frequency (in MHz) on Lower region. 6. The spur's amplitude difference from the limit (in dB) on Lower region. 7. The spur's amplitude difference from the mean transmit power (in dBc) on Lower region. 8. The spur's frequency offset from channel center frequency (in MHz) on Upper region. 9. The spur's amplitude difference from the limit (in dB) on Upper region. 10. The spur's amplitude difference from the mean transmit power (in dBc) on Upper region. 11. The spur's frequency offset from channel center frequency (in MHz) on Highest region. 12. The spur's amplitude difference from the limit (in dB) on Highest region. 13. The spur's amplitude difference from the mean transmit power (in dBc) on Highest region. 14. Reserved 15. Reserved 16. Reserved 17. Reserved 18. Reserved Note: –999.0 is retuned if the region can not be specified due to the band limit.

SPAN X Scale

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:TSP:VIEW:WIND:TRAC:Y:RLEV –10
	:DISP:TSP:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result.
	When you set a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:TSP:VIEW:WIND:TRAC:Y:PDIV 10
	DISP:TSP:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result.
	When you set a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either Top, Center or Bottom.

Mode GSM

Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:TSP:VIEW:WIND:TRAC:Y:RPOS CENT
	:DISP:TSP:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:TSP:VIEW:WIND:TRAC:Y:COUP 1
	:DISP:TSP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Ref Position manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:TSPur:ANNotation:TITLe:DATA <string>`
	`:DISPlay:TSPur:ANNotation:TITLe:DATA?`
Example	DISP:TSP:ANN:TITL:DATA “EDGE EVM”
	DISP:TSP:ANN:TITL:DATA?
Preset	GMSK Tx Band Spur
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

Changes the content of the spectrum window. The measurement splits the transmit band into four segments (or less if the currently selected ARFCN is at the edge of the band). Two of these segments are on each side of the ETSI specified transmit band. View selection allows you to select each segment in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).

- Lowest Segment – lower Tx band edge to –6 MHz offset from the channel frequency

- Lower Adj Segment – –6 MHz to –1.8 MHz offset from the channel frequency
- Upper Adj Segment – +1.8 MHz to +6 MHz offset from the channel frequency
- Highest Segment – +6 MHz offset from the channel frequency to the upper Tx band edge

[DEForce Restart	No
Mode	GSM
Restriction and Notes	Dynamically changed in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).
Preset	Lower Segment
State Saved	No
Range	Lowest Segment | Lower Adj Segment | Upper Adj Segment | Highest Segment
Key Path	**View/Display**

Trace/Detector

Accesses a menu that allows you to control trace settings.

Key Path	**Front-panel key**

Trace

Selects the trace mode from the following selections:

KEYAvg SCPIAVERage	Trace would be averaged.
KEYMax Hold SCPIMAXHold	Trace would hold maximum value.

Since 'Maximum' MUI selection is removed from Avg Type, this replaces the functionality.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:TRACe AVERage|MAXHold` `[:SENSe]:TSPur:TRACe?`
Example	TSP:TRAC AVER TSP:TRAC?
Restriction and Notes	Valid only when Avg/Hold Num is set to On.
Dependencies/Couplings	Coupled with Average Type.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	`MAXHold`
State Saved	Saved in instrument state.
Range	Avg|Max Hold
Key Path	**Trace/Detector**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

OnSets measurement averaging on.

OffSets measurement averaging off.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:AVERage:COUNt <integer>`
	`[:SENSe]:TSPur:AVERage:COUNt?`
	`[:SENSe]:TSPur:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:TSPur:AVERage[:STATe]?`
Example	TSP:AVER:COUN 100
	TSP:AVER:COUN?
	TSP:AVER 0
	TSP:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30
State Saved	Saved in instrument state.
Min	1
Max	10000
Key Path	**Meas Setup**

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 SCPIEXPonential	Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.
KEYRepeat SCPIREPeat	After reaching the average count, the averaging is reset and a new average is started.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:TSPur:AVERage:TCONtrol?`
Example	TSP:AVER:TCON EXP TSP:AVER:TCON?
Restriction and Notes	Valid only when Avg/Hold Num is set to On.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Avg Type

Selects the type of averaging.

LOG – The log of the power is averaged. (This is also known as video averaging.)

MAXimum – The maximum values are retained. Remove from MUI.

RMS – The power is averaged, providing the rms of the voltage.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:AVERage:TYPE LOG|MAXimum|RMS`
	`[:SENSe]:TSPur:AVERage:TYPE?`
Example	TSP:AVER:TYPE LOG
	TSP:AVER:TYPE?
Restriction and Notes	MAXimum is SCPI only, no MUI.
	This key is grayed out when Trace is set to Max Hold.
Dependencies/Couplings	Selecting 'MAXimum' via SCPI force to change state of Trace to 'MAXHold'.
	Selecting 'LOG' or 'RMS' force to change state of Trace to 'AVERage'.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) | Log-Pwr Avg (Video)
Key Path	**Meas Setup**

Meas Type

Selects the measurement type from the following selections:

KEYFull SCPIFULL	In Continuous Measure, it repeatedly does full search of all segments.
KEYExamine SCPIEXAMine	In Continuous Measure, after doing one full search across all segments, it parks on the worst segment and continuously updates that segment.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:TYPE EXAMine|FULL`
	`[:SENSe]:TSPur:TYPE?`

Example	TSP:TYPE EXAM TSP:TYPE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	FULL
State Saved	Saved in instrument state.
Range	Examine|Full
Key Path	**Meas Setup**

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain. Auto rules would be set IF Gain to Low Gain.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:TSPur:IF:GAIN:AUTO[:STATe]?`
Example	TSP`:IF:GAIN:AUTO ON` TSP`:IF:GAIN:AUTO?`
Dependencies/Couplings	Couple to IF Gain State.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man

Key Path	**Meas Setup**

IF Gain State

Selects the range of IF gain.

Mode	GSM
Remote Command	`[:SENSe]:TSPur:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:TSPur:IF:GAIN[:STATe]?`
Example	:TSP`:IF:GAIN ON`
	:TSP`:IF:GAIN?`
Dependencies/Couplings	Couple to IF Gain Auto, force it to Man.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	where ON = high gain
	OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup**

Limit

Sets the value for the test limit. This command does not accept units. Use :CALCulate:TSPur:LIMit:TEST to select the units dBm (absolute) or dB (relative).

dBm – Absolute limit

dBc – Relative to Mean Transmit Power.

Mode	GSM

Remote Command	:CALCulate:TSPur:LIMit[:UPPer][:DATA] <real>
	:CALCulate:TSPur:LIMit[:UPPer][:DATA]?
	:CALCulate:TSPur:LIMit:TEST ABSolute|RELative
	:CALCulate:TSPur:LIMit:TEST?
Example	CALC:TSP:LIM 100
	CALC:TSP:LIM?
	CALC:TSP:LIM:TEST ABS
	CALC:TSP:LIM:TEST?
Dependencies/Couplings	Selection of Front Panel Unit/Terminator Key would change this BAF parameter, absolute or relative. If you select dBm for terminator, BAF parameter should be changed to ABSolute(dBm).
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–36.00
	ABSolute
State Saved	Saved in instrument state.
Min	–200
Max	100
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	:CONFigure:TSPur
Example	:CONF:TSP
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup**

Trigger

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section. (for example, Pause/Resume)

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode Normal, Delta and Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:TSP:MARK:MODE OFF
	:CALC:TSP:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:TSP:MARK3:X 0 :CALC:TSP:MARK3:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37
Key Path	**Marker, Normal**

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	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:TSP:MARK10:X:POS 0 :CALC:TSP:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:TSP:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only command.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:TSP:MARK:REF 5
	:CALC:TSP:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	When queried, a single value is 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe SPECtrum|ULIMit`
	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:TSP:MARK:TRAC SPEC
	:CALC:TSP:MARK:TRAC?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SPECtrum
State Saved	Saved in instrument state.
Range	Spectrum | Upper Limit
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:TSPur:MARKer:COUPle[:STATe]?`
Example	:CALC:TSP:MARK:COUP ON
	:CALC:TSP:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer:AOFF`
Example	:CALC:TSP:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

Peak Search

Pressing Peak Search front panel key performs a peak search and opens this Peak Search menu. Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	GSM
Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`:CALC:TSP:MARK2:MAX`
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

11 EDGE Power vs. Time

Power vs. Time measures the mean transmit power during the “useful part” of bursts and verify that the power ramp fits within the defined mask. Power vs. Time also lets you view the rise, fall, and “useful part” of the bursts. Using the “Multi-Slot” function, up to eight slots in a frame can be viewed at one time.

Remote Command Results:

The following commands are used to retrieve the measurement results:

```
:CONFigure:EPVTime

:CONFigure:EPVTime:NDEFault

:INITiate:EPVTime

:FETCh:EPVTime[n]?

:READ:EPVTime[n]?

:MEASure:EPVTime[n]?
```

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

not specified or n = 1	Returns the following comma-separated scalar results: Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Start is the index of the data point at the start of the useful part of the burst Stop is the index of the data point at the end of the useful part of the burst T0 is the index of the data point where t0 occurred Burst width is the width of the burst measured at 3dB below the mean power in the useful part of the burst. Maximum value is the maximum value of the most recently acquired data (in dBm). Minimum value is the minimum value of the most recently acquired data (in dBm). Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta)
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points representing the upper mask (in dBm).
4	Returns comma-separated points representing the lower mask (in dBm).
7	Returns power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

9	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

10	Returns the following comma-separated scalar results: Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Start is the index of the data point at the start of the useful part of the burst Stop is the index of the data point at the end of the useful part of the burst T0 is the index of the data point where t0 occurred Burst width is the width of the burst measured at 3dB below the mean power in the useful part of the burst. Maximum value is the maximum value of the most recently acquired data (in dBm). Minimum value is the minimum value of the most recently acquired data (in dBm). Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta) 1st Error point is the time (in second) which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure. If the limit passes, returned data has no meaning. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONEPower vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF). Note: The returned value in Sync (Synchronization Burst) is. 10 if (BN42, BN43..BN105) = (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1, 1,1,1,0,0,1,0,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1) 11 if (BN42, BN43..BN105) = (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,1,1,0,1, 1,1,1,0,1,0,0,0,1,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1) 12 if (BN42, BN43..BN105) = (1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0, 1,0,0,1,1,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0) The returned value in Access (Access Burst) is 20 if (BN8, BN9..BN48) =

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allow you to set the display X reference value by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**Span X Scale**

Ref Value (Burst view and Multi-slot view)

Allow you to set the display X reference value.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:X:RLEV 1s
	:DISP:EPVT:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–65.0 us|–67 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s

Key Path	**SPAN X Scale**

Ref Value (Rise & Fall view)

Allow you to set the display X reference value.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV 1s
	:DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s|542.8 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Key Path	**SPAN X Scale**

Scale/Div

Allow you to set the display X scale/division value by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**Span X Scale**

Scale/Div (Burst view and Multi-slot view)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:X:PDIV 1ms
	:DISP:EPVT:VIEW:WIND:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	70.00 us|84.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Scale/Div (Rise & Fall view)

Allow you to set the display X scale/division value.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV 1ms
	:DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV?
Dependencies/Couplings	If 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	10.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Ref Position

Allows you to set the display reference position to either Left, Center or Right by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**Span X Scale**

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:X:RPOS LEFT
	:DISP:EPVT:VIEW:WIND:TRAC:X:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Rise & Fall view)

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS LEFT
	:DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Allows you to toggle the scale coupling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**Span X Scale**

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`

Example	:DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF :DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, X Auto Scaling automatically changes to Off. Behavior is the same as the “Scale Coupling” in PSA’s GSM.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

Auto Scaling (Rise & Fall view)

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF :DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either Ref Value or Scale/Div manually, X Auto Scaling automatically changes to Off. Behavior is the same as the “Scale Coupling” in PSA’s GSM.
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allow you to set the absolute power reference by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**AMPTD Y Scale**

Ref Value (Burst view and Multi-slot view)

Allow you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5
	:DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When <XREF>Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, <XREF>Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10 dBm|0.00 dBm

State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Ref Value (Rise & Fall view)

Allow you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5
	:DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When <XREF>Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, <XREF>Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup

Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allow you to enter a numeric value to change the vertical display sensitivity by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**AMPTD Y Scale**

Scale/Div (Burst view and Multi-slot view)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When <XREF>Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, <XREF>Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0

Key Path	**AMPTD Y Scale**

Scale/Div (Rise & Fall view)

Allow you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When <XREF>Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, <XREF>Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either Top, Center, or Bottom by Burst, Multi-slot and Rise & Fall views.

Mode GSM

Key Path **AMPTD Y Scale**

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to either Top, Center, or Bottom.

Mode GSM

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT
	:DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Ref Position (Rise & Fall view)

Allows you to set the display reference position to either Top, Center, or Bottom.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT
	:DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle Y axis auto scaling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Mode	GSM
Key Path	**AMPTD Y Scale**

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle Y axis auto scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle ?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0
	:DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Ref Position manually, this parameter is set to 'Off' automatically.
	Behavior is the same as the "Scale Coupling" in PSA's GSM.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

Auto Scaling (Rise & Fall view)

Allows you to toggle Y axis auto scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0
	:DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Ref Value or Ref Position manually, this parameter is set to 'Off' automatically.
	Behavior is the same as the "Scale Coupling" in PSA's GSM.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:ANNotation:TITLe:DATA <string>`
	`:DISPlay:EPVTime:ANNotation:TITLe:DATA?`
Example	DISP:EPVT:ANN:TITL:DATA “Agilent”
	DISP:EPVT:ANN:TITL:DATA?
Preset	EDGE Power vs Time
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

The View/Display key accesses a menu that allows you to select the desired view of the measurement from the following selections:

- Burst (SCPI: ALL) – views the entire burst of interest as determined by the current trigger source, burst sync, training sequence, and timeslot settings. To view a different burst of interest you must set these parameters for the selected timeslot. To view multiple slots use the Multi-Slot key described below.
- Rise & Fall (SCPI: BOTH) – zooms in on the rising and falling portions of the burst

being tested.

- Multi-Slot (SCPI: MSLot) – views the entire sweep as specified by the current Meas Time setting. Power levels for each active slot are listed in a table below the timeslot display. Also shown in the table under 1st Error Pt. is the point in time at which the signal level first exceeds the limit; to help identify the slot where a failure first occurs.
- See also, View Selection by number (SCPI only).

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[:SELect] ALL|BOTH|MSLot`
	`:DISPlay:EPVTime:VIEW[:SELect]?`
Example	:DISPlay:EPVTime:VIEW:SEL ALL
Preset	ALL
State Saved	Saved in instrument state.
Range	Burst | Rise & Fall | Multi-Slot
Key Path	**View/Display**

View Selection by number (SCPI only)

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW:NSELect <integer>`
	`:DISPlay:EPVTime:VIEW:NSELect?`
Example	:DISP:EPVT:VIEW:NSEL 3
	:DISP:EPVT:VIEW:NSEL?
Restriction and Notes	1: Burst 2: Rise & Fall 3: Multi-Slot
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3

Limit Mask

This setting is used to show (On) or hide (Off) the limit mask that is displayed on the graticule. It also disables limit checking.

NOTE This does not affect any calculation taking place.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:LIMit:MASK OFF|ON|0|1`
	`:DISPlay:EPVTime:LIMit:MASK?`
Example	:DISP:EPVT:LIM:MASK 1
	:DISP:EPVT:LIM:MASK?
Restriction and Notes	This parameter only hides or shows the limit mask line on the display. PASS/FAIL limit check would be done if Limit Test is set to On whether Limit Mask state is set to On or Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Trace/Detector

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Max Hold Trace

This key allows the user to visible/invisible Max Hold Trace.

Mode	GSM
Remote Command	`:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0` `:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	:DISPlay:EPVT:VIEW:WINDow:TRAC:MAXH ON :DISPlay:EPVT:VIEW:WINDow:TRAC:MAXH?
Dependencies/Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MAXimum | MXMinimum forces this parameter to ON.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Min Hold Trace

This key allows the user to visible/invisible Min Hold Trace.

Mode	GSM

Remote Command	`:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0` `:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`
Example	:DISP:EPVT:VIEW:WINDow:TRAC:MINH ON :DISP:EPVT:VIEW:WINDow:TRAC:MINH?
Dependencies/Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MINimum | MXMinimum forces this parameter to ON.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Info BW

Set the information bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:EPVTime:BANDwidth[:RESolution]?`
Example	:EPVT:BAND 1000
	:EPVT:BAND?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	510 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Key Path	**BW**

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:BANDwidth[:RESolution]:TYPE FLATtop|GAUSsian`
	`[:SENSe]:EPVTime:BANDwidth[:RESolution]:TYPE?`
Example	:EPVT:BAND:TYPE GAUS
	:EPVT:BAND:TYPE?
Restriction and Notes	This chooses the type of filter, either Gaussian or Flat (Flatop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. Even though they have a 5.5% wider noise bandwidth for the same –3 dB bandwidth as a flat top filter, that is only 0.23 dB more noise, and their step response is much cleaner and free of overshooting and ringing. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian | Flat
Key Path	**BW**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Set the number of bursts that are averaged. After the specified number of bursts (average counts), the averaging mode (termination control) setting determines the averaging action.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:AVERage:COUNt <integer>`
	`[:SENSe]:EPVTime:AVERage:COUNt?`
	`[:SENSe]:EPVTime:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EPVTime:AVERage[:STATe]?`
Example	:EPVT:AVER:COUN 3
	:EPVT:AVER:COUN?
	:EPVT:AVER 1
	:EPVT:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Key Path	**Meas Setup**

Avg Mode

Selects the type of termination control used for the averaging function. This selection only affects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Exponential averaging SCPI:EXPonential	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
Repeat averaging SCPI:REPeat	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:EPVTime:AVERage:TCONtrol?`
Example	:EPVT:AVER:TCON REP
	:EPVT:AVER:TCON?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Avg Type

Selects the averaging type, according to the following alternatives:

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	Keeps track of the maximum values.
KEY:None SCPI:MINimum	Keeps track of the minimum values.
KEY:None SCPI:MXMinimum	Keeps track of the maximum and minimum values.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:AVERage:TYPE LOG|RMS|MAXimum|MINimum|MXMinimum` `[:SENSe]:EPVTime:AVERage:TYPE?`
Example	:EPVT:AVER:TYPE RMS :EPVT:AVER:TYPE?
Restriction and Notes	Maximum | Minimum | Max&Min are removed from FP selections, are selected only via SCPI.
Dependencies/Couplings	Selecting MAXimum | MINimum | MXMinimum force to visible Max Hold Trace or | and Min Hold Trace. Measure Trace stays in RMS or Video average state.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS) | Log-Pwr Avg(Video)
Key Path	**Meas Setup**

Burst Sync

Pressing the Burst Sync key allows you to choose the source used to synchronize the measurement to the “T0” point of the EDGE burst. The “T0” point is defined as the time point of the transition from bit 13 to bit 14 of the midamble training sequence for a given time slot. The Burst Search Threshold setting (in the Mode Setup keys under Demod menu) applies to both Training Seq and RF Amptd. Pressing the Burst Sync key brings up a menu with some or all of the following choices:

Training Seq (SCPI: TSEQuence)

RF Amptd (SCPI: RFBurst)

None (SCPI:NONE)

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:BSYNc:SOURce TSEQuence|RFBurst|NONE`
	`[:SENSe]:EPVTime:BSYNc:SOURce?`
Example	:EPVT:BSYN:SOUR NONE
	:EPVT:BSYN:SOUR?
Dependencies/Couplings	If the selected Burst Sync is “NONE”, the Timeslot Length soft key becomes active. Otherwise the key is grayed-out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd|None
Key Path	**Meas Setup**

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:EPVTime:IF:GAIN:AUTO[:STATe]?`
Example	EPVT:IF:GAIN:AUTO ON
	EPVT:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, More, IF Gain**

IF Gain State

Selects the range of IF gain.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:EPVTime:IF:GAIN[:STATe]?`
Example	:EPVT:IF:GAIN ON
	:EPVT:IF:GAIN?
Dependencies/Couplings	Couple to IF Gain Auto force it to Man.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup, More, IF Gain**

Meas Time

Allows you to measure more than one timeslot. Enter a value in integer increments of "slots" with a range of 1 to 8. The actual measure time, in µs, is set somewhat longer than the specified number of slots, in order to view the complete burst.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:SWEep:TIME <integer>` `[:SENSe]:EPVTime:SWEep:TIME?`
Example	:EPVT:SWE:TIME 8 :EPVT:SWE:TIME?
Restriction and Notes	The actual sweep time may be slightly larger than requiredSweepTime due to limited trace point resolution, this is a hardware dependency.
Dependencies/Couplings	Scale/Div of X scale of Multi Slot View varies according to this value. Scale/Div should be adjusted to show set meas time.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 slot
State Saved	Saved in instrument state.
Min	1
Max	8
Key Path	**Meas Setup, More**

Limit Test

Turn on or off limit pass/fail testing. Doesn't affect limit line display.

Backward Compatibility SCPI	[:SENSe]:EPVTime:LIMit:TEST
Mode	GSM
Remote Command	`:CALCulate:EPVTime:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:EPVTime:LIMit:TEST[:STATe]?`
Example	:CALC:EPVT:LIM:TEST ON :CALC:EPVT:LIM:TEST?
Restriction and Notes	This is not the same as the Limit Mask – the measurement results are checked against the PVT Limit parameter to see if they meet the limit requirements if set to On. If set to Off, PASS/FAIL indicator on the Meas Bar goes blank.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Limit Mask

Allows you to select Limit Mask type, against which the measured data is compared.

KEYStandard SCPISTANdard	The measurement algorithm uses standard-defined limit mask.
KEYCustom SCPICUSTom	The measurement algorithm uses user-defined custom limit mask.

For custom Limit Mask commands, see also:

Lower Mask Absolute Amplitude Levels

Lower Mask Points

Lower Mask Relative Amplitude Levels

Lower Mask Time Points

Upper Mask Absolute Amplitude Levelser Mask Absolute Amplitude Levels

Upper Mask Points

Upper Mask Relative Amplitude Levels

Upper Mask Time Points

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:MASK:SELect STANdard|CUSTom`
	`[:SENSe]:EPVTime:MASK:SELect?`
Example	:EPVT:MASK:SEL STAN
	:EPVT:MASK:SEL?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	STANdard
State Saved	Saved in instrument state.
Range	Std | Custm
Key Path	**Meas Setup, More**

Timeslot Length

Allows user to change how the limit mask applies for each slot, when in a multi-slot measurement.

KEYAll 156.25 symb SCPIEVEN	The measurement algorithm generates limit mask with the same slot length. All slots have 156.25 symbol

KEY157/156 symb SCPIINTeger	The measurement algorithm generates limit mask for slot 0 and 4 with slot length 157 symbol. And, the algorithm generates limit mask for slot 1, 2, 3, 5, 6, 7 with slot length 156 symbol. Slot 0 here is simply the first slot in the captured data, not the absolute slot determined by training sequence number.

Mode	GSM
Remote Command	`[:SENSe]:EPVTime:BSYNc:SLENgth EVEN|INTeger` `[:SENSe]:EPVTime:BSYNc:SLENgth?`
Example	EPVT:BSYN:SLEN INT EPVT:BSYN:SLEN?
Dependencies/Couplings	This parameter is available only if the Burst Sync type is None. Otherwise grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	INTeger
State Saved	Saved in instrument state.
Range	All 156.25 symb | 157/156 symb
Key Path	**Meas Setup, More**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:EPVTime`
Example	:CONF:EPVT
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Mask Remote Commands

The following commands are to define the upper and lower masks.

See also:

Lower Mask Absolute Amplitude Levels

Lower Mask Points

Lower Mask Relative Amplitude Levels

Lower Mask Time Points

Upper Mask Absolute Amplitude Levelser Mask Absolute Amplitude Levels

Upper Mask Points

Upper Mask Relative Amplitude Levels

Upper Mask Time Points

Lower Mask Absolute Amplitude Levels

Enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined. As the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is lower than the specified absolute limit, then the value of the absolute limit is user for this segment. Therefore, if the absolute reference limit is set to a very low value, the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:LOW:TIME must have a power value defined in the same order.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute <real>, …` `[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute?`
Example	:EPVT:MASK:LIST:LOW:ABS 0,–10,–60 :EPVT:MASK:LIST:LOW:ABS?
Dependencies/Couplings	Relative Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200,–200

State Saved	Saved in instrument state.
Min	–200 dBm
Max	100 dBm

Lower Mask Points

Query the number of elements in the lower mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:LOW:TIME.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:LOWer:POINts?`
Example	EPVT:MASK:LIST:LOW:POIN?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only.

Lower Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the lower limit mask. There should be a power level for each time point entered using [:SENSe]:EPVTime:MASK:LIST:LOWer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask has been defined, the Reference Power Level is the mid-point between these two limits at time T0.

Any portion of the signal that has no limit line segment defined for it defaults to a very low limit (–100dB relative to the reference power). This keeps the measurement from indicating a failure for that portion of the data.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative <rel_ampl>,`
	…
	`[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative?`

Example	EPVT:MASK:LIST:LOW:REL?
Dependencies/Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	–200,–200
State Saved	Saved in instrument state.
Min	–200
Max	200

Lower Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the lower limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 reference point is a negative time value.

First enter positive values in sequence starting from t0, then negative values in sequence starting from t0.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME <seconds>, …`
	`[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME?`
Example	EPVT:MASK:LIST:LOW:TIME 1,1
	EPVT:MASK:LIST:LOW:TIME?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1,–1
State Saved	Saved in instrument state.
Min	–1 s
Max	1 s

Upper Mask Absolute Amplitude Levels

Allows you to enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined (This is the power level of the useful part of the burst, or midway between the upper/lower masks). Remember that, as the power of the Ref Level changes, all of the relative mask power levels changes by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power

level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is higher than the specified absolute limit, then the value of the absolute limit is user for this segment. Therefore, if the absolute reference limit is set to a very low value (–200 dBm), the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:UPP:TIME must have a power value defined in the same order.

Front Panel nit/Terminator Keys	dBm
Remote Command	`[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute <real>, …`
	`[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute?`
Example	EPVT:MASK:LIST:UPP:ABS –200,–200,–58,–200,–200,–200,–200,–58,–200
	EPVT:MASK:LIST:UPP:ABS?
Dependencies/Couplings	Relative Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200,–200
State Saved	Saved in instrument state.
Min	–200
Max	100

Upper Mask Points

Queries the number of elements in the upper mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:UPP:TIME.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:UPPer:POINts?`
Example	EPVT:MASK:LIST:UPP:POIN?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Query only.

Upper Mask Relative Amplitude Levels

Enter the relative power level for each horizontal line segment in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:EPVTime:MASK:LIST:UPPer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask has been defined, the Reference Power Level is the mid-point between these two limits.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative <rel_ampl>, …` `[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative?`
Example	EPVT:MASK:LIST:UPP:REL 4,–32,–48,100,4,7,–25,–43,100 EPVT:MASK:LIST:UPP:REL?
Dependencies/Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	100,100
State Saved	Saved in instrument state.
Min	–200
Max	200

Upper Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the upper limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 is a negative time value.

First enter positive values in sequence starting from t0, then the negative values in sequence starting from t0.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you’ve defined a limit for all the measured data.

Remote Command	`[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME <seconds>, …` `[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME?`
Example	EPVT:MASK:LIST:UPP:TIME 1,–1 EPVT:MASK:LIST:UPP:TIME?

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1,–1
State Saved	Saved in instrument state.
Min	–1 s
Max	1 s

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See Triggers in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Allow you to choose a trigger source. Trigger settings are Measurement global. Refer to Mode functionality section for trigger settings.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst (Wideband) SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called ‘frame clock’) to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:EPVTime[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo`
	`:TRIGger:EPVTime[:SEQuence]:SOURce?`
Example	:TRIG:EPVT:SOUR IMM
	:TRIG:EPVT:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run(Immediate) | Video | Line | External 1 | External 2 | RF Burst | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section.

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode as described under **Normal**, **Delta** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:EPVT:MARK:MODE OFF
	:CALC:EPVT:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`
Example	:CALC:EPVT:MARK3:X 0 :CALC:EPVT:MARK3:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Meas Time parameter value.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:EPVT:MARK10:X:POS 0 :CALC:EPVT:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:EPVT:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:EPVT:MARK:REF 2
	:CALC:EPVT:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	When queried a single value is 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|UMASk|LMASk|MAXRfenvelop|MINRfenvelop` `:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:EPVT:MARK:TRAC LMAS :CALC:EPVT:MARK:TRAC?
Restriction and Notes	Max Hold RF Envelop is only available when Max Trace is set to On. Min Hold RF Envelop is only available when Min Hold Trace is set to On. Otherwise, the menu keys are grayed out and the commands are unavailable.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope | Upper Mask | Lower Mask | Max Hold RF Envelope | Min Hold RF Envelope
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EPVTime:MARKer:COUPle[:STATe]?`

Example	:CALC:EPVT:MARK:COUP ON :CALC:EPVT:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:EPVTime:MARKer:AOFF`
Example	:CALC:EPVT:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

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.

Mode	GSM, SA
Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:EPVT:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

12 EDGE EVM

EVM (Error Vector Magnitude) is the measure of modulation quality for EDGE. Since EDGE uses 3/8 PSK modulation, the transmitter's phase, frequency, and amplitude accuracy are critical to the communications system's performance. EVM also ultimately affects range.

Remote Command Results:

The following commands can be used to retrieve the measurement results:

```
:CONFigure:EEVM

:CONFigure:EEVM:NDEFault

:INITiate:EEVM

:FETCh:EEVM[n]?

:READ:EEVM[n]?

:MEASure:EEVM[n]?
```

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.

1 (default)	Returns the following scalar results: RMS 95th %tile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected. Average Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. Maximum Magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area. Average Phase error – a floating point number (in degree) of average phase error over the entire measurement area. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst. Trigger to T0 - a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.
2	Returns series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
3	Returns series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
4	Returns series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.

5	Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. 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 is 1 point per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . (2) 1 (or 3rd) number = I of the symbol 1 decision point (2) 2 (or 4th) number = Q of the symbol 1 decision point . . . (2) x N + 1 number = I of the symbol N decision point (2) x N + 2 number = Q of the symbol N decision point
6	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM. Test results of RMS EVM Test results of Peak EVM Test results of 95% tile EVM Test results of I/Q Origin Offset Test results of Frequency Error
7	Returns series of integer values that represent the demoded symbols (octal bits) of the final corrected measured data for the last slot. Each bit/symbol is represented as a value between 0 – 7. All 142 symbols in slot are returned..

8	Returns the following scalar results: RMS 95th %tile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected. Average Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. Maximum Magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area. Average Phase error – a floating point number (in degree) of average phase error over the entire measurement area. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst. Trigger to T0 - a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Timing Offset of AM/PM path - a floating number (in sec) of the time interval between Amplitude Modulation path and Phase Modulation path. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONEPower vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF). Reserved for future use (floating point) – the value returned is –999.0. Reserved for future use (floating point) – the value returned is –999.0. Reserved for future use (floating point) – the value returned is –999.0. Reserved for future use (floating point) – the value returned is –999.0. Reserved for future use (floating point) – the value returned is –999.0.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set X reference value.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:EEVM:VIEW2:WIND3:TRAC:X:RLEV 1 :DISP:EEVM:VIEW2:WIND3:TRAC:X:RLEV?
Dependencies/Couplings	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is Symbol(s).
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000.0
Key Path	**SPAN / X Scale**

Scale/Div

Allows you to change the horizontal scale.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:PDIVision <real>`
	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:EEVM:VIEW2:WIND:TRAC:X:SCAL:PDIV 1.2
	:DISP:EEVM:VIEW2:WIND:TRAC:X:SCAL:PDIV?
Dependencies/Couplings	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Symbol(s).
Preset	14.10
State Saved	Saved in instrument state.
Range	1.0 to 500000.0
Key Path	**SPAN / X Scale**

Ref Position

Allows you to set the reference position.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:EEVM:VIEW2:WIND3:TRAC:X:SCAL:RPOS CENT
	:DISP:EEVM:VIEW2:WIND3:TRAC:X:SCAL:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT

State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN / X Scale**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:EEVM:VIEW2:WIND:TRAC:X:SCAL:COUP ON :DISP:EEVM:VIEW2:WIND:TRAC:X:SCAL:COUP?
Dependencies/Couplings	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X Rel Value or X Scale/Div manually, X Auto Scaling automatically changes to Off..
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN / X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set reference value by error vector magnitude or phase error.

Mode	GSM
Key Path	**AMPTD Y Scale**

Ref Value (Mag Error or EVM)

Allows you to set reference value using Error Vector Magnitude.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EEVM:VIEW2:WIND:TRAC:Y:SCAL:RLEV 10
	:DISP:EEVM:VIEW2:WIND:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is %.
Preset	0
State Saved	No

Min	–500
Max	500
Key Path	**AMPTD Y Scale**

Ref Value (Phase Error)

Allows you to set reference value using Phase Error.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EEVM:VIEW2:WIND2:TRAC:Y:SCAL:RLEV 2
	:DISP:EEVM:VIEW2:WIND2:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	0
State Saved	No
Min	–36000
Max	36000
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Sets the Y scale per division on the display, using percent (EVM) or degrees (Phase Error).

Mode	GSM
Key Path	**AMPTD Y Scale**

Scale/Div (Max Error or EVM)

Sets the vertical scale per division in percent.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:PDIVision <real>`
	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:EEVM:VIEW2:WIND:TRAC:Y:SCAL:PDIV 2
	:DISP:EEVM:VIEW2:WIND:TRAC:Y:SCAL:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is %.
Preset	1
State Saved	No
Min	0.1
Max	50.0
Key Path	**AMPTD Y Scale**

Scale/Div (Phase Error)

Sets the vertical scale per division in degrees.

Mode	GSM
Remote Command	:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>
	:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?
Example	:DISP:EEVM:VIEW2:WIND2:TRAC:Y:SCAL:PDIV 2
	:DISP:EEVM:VIEW2:WIND2:TRAC:Y:SCAL:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	1.0
State Saved	No
Min	0.01
Max	3600
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the reference position.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EEVM:VIEW2:WIND3:TRAC:Y:SCAL:RPOS TOP
	:DISP:EEVM:VIEW2:WIND3:TRAC:Y:SCAL:RPOS?

Remote Command Notes	Preset\Default is window dependent as follows: View – I/Q Error, Window – Mag Error: Ctr View – I/Q Error, Window – Phase Error: Ctr View – I/Q Error, Window – EVM: Bot You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT | CENT | BOTT
State Saved	No
Range	Top | Ctr | Bot
Key Path	**AMPTD / Y Scale, More**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EEVM:VIEW2:WIND3:TRAC:Y:SCAL:COUP ON :DISP:EEVM:VIEW2:WIND3:TRAC:Y:SCAL:COUP?
Dependencies/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 user sets a value either Y Rel Value or Y Scale/Div manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	No
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:EEVM:ANNotation:TITLe:DATA <string>`
	`:DISPlay:EEVM:ANNotation:TITLe:DATA?`
Example	DISP:EEVM:ANN:TITL:DATA “EDGE EVM”
	DISP:EEVM:ANN:TITL:DATA?
Preset	EDGE EVM
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

You can select desired view of the measurement from the following:

- I/Q Measured Polar Graph (SCPI: POLar) – Provides a view of numeric results and a polar vector graph.
  Window 1: Numeric Results
  Window 2: I/Q Polar Graph
- I/Q Error (SCPI: ERRor) – Provides a combination view including

Window 1: Magnitude Error
Window 2: Phase Error
Window 3: EVM
Window 4: Numeric Results
Any of these windows can be selected (using the Next Window key) and made full size (using the Zoom key).

Data Bits (SCPI: DBITs) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW[:SELect] POLar|ERRor|DBITs`
	`:DISPlay:EEVM:VIEW[:SELect]?`
Example	:DISP:EEVM:VIEW:SEL QUAD
	:DISP:EEVM:VIEW:SEL?
Restriction and Notes	- POLar: I/Q Measured Polar Graph
	- ERRor : I/Q Error
	- DBITs : Data Bits
Dependencies/Couplings	View Selection by number must be coupled with this parameter value.
	Selecting POLar changed DISP:EEVM:VIEW:WIND2:TRAC:POL to VC.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Measured Polar Graph | I/Q Error | Data Bits
Key Path	**View/Display**

View Selection by number (SCPI only)

You can select desired view with view number.

- 1 : I/Q Measured Polar Graph (SCPI: 1) – Provides a view of numeric results and a polar vector graph.
  Window 1: Numeric Results
  Window 2: I/Q Polar Graph
- 2 : I/Q Error (SCPI: 2) – Provides a combination view including
  Window 1: Magnitude Error

Window 2: Phase Error
Window 3: EVM
Window 4: Numeric Results
Any of these windows can be selected (using the Next Window key) and made full size (using the Zoom key).

3 : Data Bits (SCPI: 3) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

Mode	GSM
Remote Command	`:DISPlay:EEVM:VIEW:NSELect <integer>` `:DISPlay:EEVM:VIEW:NSELect?`
Example	:DISP:EEVM:VIEW:NSEL 3 :DISP:EEVM:VIEW:NSEL?
Restriction and Notes	1: I/Q Measured Polar Graph 2: IQ Error 3: Data Bits
Dependencies/Couplings	View Selection must be coupled with this parameter value.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation will allow you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)

Constellation Only (SCPI: CONStln)

Mode	GSM

Remote Command	`:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC|VECTor|CONStln`
	`:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?`
Example	:DISP:EEVM:VIEW:WIND2:TRAC:POL VC
	:DISP:EEVM:VIEW:WIND2:TRAC:POL?
Restriction and Notes	VC : Vect & Constln
	VECTor: Vector
	CONStln : Constellation
Dependencies/Couplings	DISP:EEVM:VIEW POL would change this parameter to POL.
	DISP:EEVM:VIEW CONS would change this parameter to CONS.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln | Vector | Constellation
Key Path	**View/Display**

Time Offset Unit

Toggles the unit of Time Offset result between Symbol and Second.

Mode	GSM
Remote Command	`:DISPlay:EEVM:TEXT:TFUNit SECond|SYMBol`
	`:DISPlay:EEVM:TEXT:TFUNit?`
Example	DISP:EEVM:TEXT:TFUN SEC
	DISP:EEVM:TEXT:TFUN?
Restriction and Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBol".
Preset	SEC
State Saved	Saved in instrument state.
Range	sec | symbols
Key Path	**View/Display, Display**

Symbol Dots

This Allows you to toggle the symbol dots between On and Off.

On: would turn on blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.

Off: would turn off blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.

Backward Compatibility SCPI	[:SENSe]:EEVM:SDOTs[:STATe]
Mode	GSM
Remote Command	`:DISPlay:EEVM:SDOTs[:STATe] OFF|ON|0|1` `:DISPlay:EEVM:SDOTs[:STATe]?`
Example	:DISP:EEVM:SDOT ON :DISP:EEVM:SDOT?
Restriction and Notes	This parameter would not control constellation visible/invisible state on I/Q Measured Polar Graph.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Trace/Detector

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg /Hold Num

Sets the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Mode	GSM
Remote Command	`[:SENSe]:EEVM:AVERage:COUNt <integer>`
	`[:SENSe]:EEVM:AVERage:COUNt?`
	`[:SENSe]:EEVM:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EEVM:AVERage[:STATe]?`
Example	:EEVM:AVER:COUN 3
	:EEVM:AVER:COUN?
	:EEVM:AVER ON
	:EEVM:AVER?
Dependencies/Couplings	When this value is changed, Avg State is set to On.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Range	1 to 10000
Key Path	**Meas Setup**

Avg Mode

Select the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

- Exponential averaging – 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. The weighting factor N is set using the Averages, Avg Bursts key.
- Repeat averaging – 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.

Mode	GSM
Remote Command	`[:SENSe]:EEVM:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:EEVM:AVERage:TCONtrol?`
Example	:EEVM:AVER:TCON REP
	:EEVM:AVER:TCON?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Burst Sync

Select the method of synchronizing the measurement to the bursts.

Training Sequence (TSEQuence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.

Polar Modulation -The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence. (It's same as "Training Seq") The measurement start searching training sequence both on amplitude path and phase path to make synchronization

None – The measurement is performed without searching burst.

Mode	GSM
Remote Command	`[:SENSe]:EEVM:BSYNc:SOURce TSEQuence|RFBurst|PMODulation|NONE`
	`[:SENSe]:EEVM:BSYNc:SOURce?`
Example	:EEVM:BSYNC:SOURCE RFB
	:EEVM:BSYNC:SOURCE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	RFAMplitude must be work as RFBurst.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq | RF Amptd | Polar Modulation | None
Key Path	**Meas Setup**

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain

Mode	GSM

Remote Command	`[:SENSe]:EEVM:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:EEVM:IF:GAIN:AUTO[:STATe]?`
Example	`EEVM:IF:GAIN:AUTO ON`
	`EEVM:IF:GAIN:AUTO?`
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, More, IF Gain**

IF Gain State

Mode	GSM
Remote Command	`[:SENSe]:EEVM:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:EEVM:IF:GAIN[:STATe]?`
Example	`:EEVM:IF:GAIN ON`
	`:EEVM:IF:GAIN?`
Dependencies/Couplings	Couple to IF Gain Auto force it to Man.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	where ON = high gain
	OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.

Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup, More, IF Gain**

Limits

Accesses a menu that enables you to set the Limit Test to on or off and the Test Condition to a normal or extreme limit table.

Mode	GSM
Key Path	**Meas Setup, More**

Limit Test

Turns on or off limit pass/fail testing.

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:EEVM:LIMit:TEST[:STATe]?`
Example	:CALC:EEVM:LIM:TEST ON :CALC:EEVM:LIM:TEST?
Restriction and Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Meas Setup, More, Limits**

Test Condition

This measurement could have different limit table for different test environment, Normal

and Extreme. This parameter allows user to select which limit table to be modified and used for the judgement.

Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:TYPE NORMal|EXTReme
	:CALCulate:EEVM:LIMit:TYPE?
Example	:CALC:EEVM:LIMit:TYPE NORM
	:CALC:EEVM:LIMit:TYPE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm | Extreme
Key Path	**Meas Setup, Limits**

RMS EVM

On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition.

But SCPI command can set each test limit without setting the radio device, BTS type and test condition because it contains the information of radio device, BTS type and test condition.

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

RMS EVM (Radio Type is BTS, Test Condition is Normal)

Mode	GSM
Remote Command	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real>
	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM?
Example	:CALC:EEVM:LIM:BTS:NORM:REVM 12
	:CALC:EEVM:LIM:BTS:NORM:REVM?

Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

RMS EVM (Radio Type is BTS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM?`
Example	:CALC:EEVM:LIM:BTS:EXTR:REVM 15
	:CALC:EEVM:LIM:BTS:EXTR:REVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

RMS EVM (Radio Type is MS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM?`

Example	:CALC:EEVM:LIM:MS:NORM:REVM 20 :CALC:EEVM:LIM:MS:NORM:REVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

RMS EVM (Radio Type is MS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:REVM?`
Example	:CALC:EEVM:LIM:MS:EXTR:REVM 15 :CALC:EEVM:LIM:MS:EXTR:REVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

Peak EVM

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

Peak EVM (Radio Type is BTS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?`
Example	:CALC:EEVM:LIM:BTS:NORM:PEVM 12
	:CALC:EEVM:LIM:BTS:NORM:PEVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

Peak EVM (Radio Type is BTS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM?`
Example	:CALC:EEVM:LIM:BTS:EXTR:PEVM 15
	:CALC:EEVM:LIM:BTS:EXTR:PEVM?

Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

Peak EVM (Radio Type is MS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:PEVM?`
Example	:CALC:EEVM:LIM:MS:NORM:PEVM 20
	:CALC:EEVM:LIM:MS:NORM:PEVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

Peak EVM (Radio Type is MS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM?`

Example	:CALC:EEVM:LIM:MS:EXTR:PEVM 15 :CALC:EEVM:LIM:MS:EXTR:PEVM?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

95% tile EVM

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

95% tile EVM (Radio Type is BTS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?`
Example	:CALC:EEVM:LIM:BTS:NORM:EVMP95 12 :CALC:EEVM:LIM:BTS:NORM:EVMP95?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.

Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

95% tile EVM (Radio Type is BTS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95 <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95?`
Example	:CALC:EEVM:LIM:BTS:EXTR:EVMP95 15
	:CALC:EEVM:LIM:BTS:EXTR:EVMP95?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

95% tile EVM (Radio Type is MS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?`
Example	:CALC:EEVM:LIM:MS:NORM:EVMP95 20
	:CALC:EEVM:LIM:MS:NORM:EVMP95?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	15.0

State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

95% tile EVM (Radio Type is MS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95 <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95?`
Example	:CALC:EEVM:LIM:MS:EXTR:EVMP95 15
	:CALC:EEVM:LIM:MS:EXTR:EVMP95?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Range	0.0 to 100.0
Key Path	**Meas Setup, Limits**

I/Q Origin Offset

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

I/Q Origin Offset (Radio Type is BTS, Test Condition is Normal)

Mode	GSM

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset?`
Example	:CALC:EEVM:LIM:BTS:NORM:IQOO –12
	:CALC:EEVM:LIM:BTS:NORM:IQOO?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–35
State Saved	Saved in instrument state.
Range	–100 to 0.0
Key Path	**Meas Setup, Limits**

I/Q Origin Offset (Radio Type is BTS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset?`
Example	:CALC:EEVM:LIM:BTS:EXTR:IQOO –15
	:CALC:EEVM:LIM:BTS:EXTR:IQOO?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–35.0
State Saved	Saved in instrument state.
Range	–100.0 to 0.0
Key Path	**Meas Setup, Limits**

I/Q Origin Offset (Radio Type is MS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset?`
Example	:CALC:EEVM:LIM:MS:NORM:IQOO –20
	:CALC:EEVM:LIM:MS:NORM:IQOO?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30.0
State Saved	Saved in instrument state.
Range	–100.0 to 0.0
Key Path	**Meas Setup, Limits**

I/Q Origin Offset (Radio Type is MS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset?`
Example	:CALC:EEVM:LIM:MS:EXTR:IQOO –15
	:CALC:EEVM:LIM:MS:EXTR:IQOO?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30.0
State Saved	Saved in instrument state.
Range	–100.0 to 0.0
Key Path	**Meas Setup, Limits**

Freq Error

Mode	GSM
Key Path	**Meas Setup, Mode, Limits**

Freq Error (Radio Type is BTS, BTS Type is Normal, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor?`
Example	:CALC:EEVM:LIM:BTS:NORM:FERR 0.1
	:CALC:EEVM:LIM:BTS:NORM:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Normal or Micro and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Range	0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is BTS, BTS Type is Normal, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor?`
Example	:CALC:EEVM:LIM:BTS:EXTR:FERR 0.1
	:CALC:EEVM:LIM:BTS:EXTR:FERR?

Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Normal or Micro and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Range	0.0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is BTS, BTS Type is Micro, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor <real>`
	`:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor?`
Example	:CALC:EEVM:LIM:MBTS:NORM:FERR 0.1
	:CALC:EEVM:LIM:MBTS:NORM:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Normal or Micro and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Range	0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is BTS, BTS Type is Micro, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor <real>`
	`:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor?`

Example	:CALC:EEVM:LIM:MBTS:EXTR:FERR 0.1 :CALC:EEVM:LIM:MBTS:EXTR:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Normal or Micro and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Range	0.0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is BTS, BTS Type is Pico, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real>` `:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?`
Example	:CALC:EEVM:LIM:PBTS:NORM:FERR 0.1 :CALC:EEVM:LIM:PBTS:NORM:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Pico and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Range	0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is BTS, BTS Type is Pico, Test Condition is Extreme)

Mode	GSM

Remote Command	`:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor <real>`
	`:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor?`
Example	:CALC:EEVM:LIM:PBTS:EXTR:FERR 0.2
	:CALC:EEVM:LIM:PBTS:EXTR:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is BTS and “BTS Type” is Pico and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Range	0.0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is MS, Test Condition is Normal)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:FERRor?`
Example	:CALC:EEVM:LIM:MS:NORM:FERR 0.1
	:CALC:EEVM:LIM:MS:NORM:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Normal.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Range	0 to 50.0
Key Path	**Meas Setup, Limit**

Freq Error (Radio Type is MS, Test Condition is Extreme)

Mode	GSM
Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:FERRor <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:FERRor?`
Example	:CALC:EEVM:LIM:MS:EXTR:FERR 0.2
	:CALC:EEVM:LIM:MS:EXTR:FERR?
Restriction and Notes	This parameter can only set front panel using “Limits” key if the device selected by “Device” key is MS and “Test Condition” is Extreme.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Range	0.0 to 50.0
Key Path	**Meas Setup, Limit**

Droop Compensation

Turn droop compensation on or off. Droop compensation corrects amplitude variations across a burst. You may want to turn off this compensation so you can see the changes in the measured magnitude error. Droop can result from signal impairments like a power amplifier problem.

Mode	GSM
Remote Command	`[:SENSe]:EEVM:DROop OFF|ON|0|1`
	`[:SENSe]:EEVM:DROop?`
Example	:EEVM:DRO ON
	:EEVM:DRO?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Polar Mod Align

Turn On/Off polar modulation alignment.

Mode	GSM
Remote Command	`[:SENSe]:EEVM:BSYNc:PMODulation:ALIGnment OFF|ON|0|1`
	`[:SENSe]:EEVM:BSYNc:PMODulation:ALIGnment?`
Example	:EEVM:BSYNC:PMOD:ALIG OFF
	:EEVM:BSYNC:PMOD:ALIG?
Restriction and Notes	Grayed out unless the Burst Sync is set to Polar Modulation.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:EEVM`
Example	:CONF:EEVM
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See Trigger in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Allow you to choose a trigger source. Trigger settings are mode global. Refer to Mode functionality section for trigger settings.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst (Wideband) SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called ‘frame clock’) to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:EEVM[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo` `:TRIGger:EEVM[:SEQuence]:SOURce?`
Example	TRIG:EEVM:SOUR EXT TRIG:EEVM:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run (Immediate) | Video | Line | External 1 | External 2 | RF Burst | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section. (for example, Pause/Resume)

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses the Marker menus.

Key Path	**Front-panel key**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:EEVM:MARK:MODE OFF
	:CALC:EEVM:MARK:MODE?
Restriction and 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.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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**.

Front Panel nit/Terminator Keys	symbols
Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`
Example	:CALC:EEVM:MARK3:X 0 :CALC:EEVM:MARK3:X?
Restriction and 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**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <integer>` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`
Example	:CALC:EEVM:MARK10:X:POS 0 :CALC:EEVM:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:EEVM:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. If 'Polar' is selected for Marker Trace, it returns the values of 'I' and 'Q' at the same time.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Select Marker

Specifies the selected marker.

Key Path	**Marker, Properties**

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer> :CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?
Example	:CALC:EEVM:MARK:REF 2 :CALC:EEVM:MARK:REF?
Restriction and 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."
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe MERRor|PERRor|EVM|POLar :CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?

Example	:CALC:EEVM:MARK:TRACE PERR :CALC:EEVM:MARK:TRACE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EVM
State Saved	Saved in instrument state.
Range	IQ Polar | Mag Error | Phase Error | EVM
Key Path	**Marker, Properties**

Couple Marker

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). This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EEVM:MARKer:COUPle[:STATe]?`
Example	:CALC:EEVM:MARK:COUP ON :CALC:EEVM:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer:AOFF`
Example	:CALC:EEVM:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

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.

If Marker Trace of selected marker is POL, peak search would not be performed.

Mode	GSM
Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:EEVM:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front-panel key**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front-panel key**

13 EDGE Output RF Spectrum

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement.

Remote Command Results:

The following commands can be used to retrieve the measurement results:

```
:CONFigure:EORFspectr

:CONFigure:EORFspectr:NDEFault

:INITiate:EORFspectr

:FETCh:EORFspectr[n]?

:READ:EORFspectr[n]?

:MEASure:EORFspectr[n]?
```

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: Modulation spectrum power, dB Modulation spectrum power, dBm Switching transient power, dB Switching transient power, dBm

Multi-Offset	not specified or n = 1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: Negative offset(a) - power relative to carrier (dB) Negative offset(a) - absolute average power (dBm) Positive offset(a) - power relative to carrier (dB) Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) *(15 offsets) *(2 measurement types - modulation & switching) Carrier – modulation measurement values Offset 1 – modulation measurement values and so on ~ Offset 14 – modulation measurement values Carrier – switching transients measurement values Offset 1 – switching transients measurement values ~ Offset 14 – switching transients measurement values and so on This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: Frequency Offset frequency from carrier frequency Power in dBm delta from limit (dB) delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.
Multi-Offset or Swept	2	Nothing returns.

Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Returns NULL.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Returns NULL.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Returns NULL.
Multi-Offset	6	Relative level to the test limit, and test limit itself for both modulation and switching transient measurements. Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order: 1. Relative level to the test limit (dB) at the negative offset frequency 2. Relative level to the test limit (dB) at the positive offset frequency 3. Relative test limit used (dB) 4. Absolute test limit used (dBm) Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transients measurement results are 0.0. The total number of values returned is: 120 = (4 results / offset) * (15 offset frequencies) * (2 measurement types) Carrier (Offset A) – modulation measurement results Offset 1 (Offset B) - modulation measurement results . . . . . . Offset 14 (Offset O) - modulation measurement results Carrier (Offset A)– switching transients measurement results Offset 1 (Offset B) – switching transients measurement results . . . . . . Offset 14 (Offset O) – switching transients measurement results

Single Offset or Swept	6	Returns NULL.
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set the display X reference value.

Mode	GSM
Key Path	**Span X Scale**

Ref Value (RF Envelope window)

Allows you to set the display X reference value in the RF Envelope window..

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:EORF:VIEW:WIND:TRAC:X:RLEV 1s :DISP:EORF:VIEW:WIND:TRAC:X:RLEV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset.
Dependencies/Couplings	If the X_Auto_Scaling is On, this value is automatically determined by the measurement result. When you set a value manually X_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.000 us

State Saved	Saved in instrument state.
Min	–1.00 s
Max	10.00 s
Key Path	**SPAN X Scale**

Ref Value (Spectrum window)

Allows you to set the display X reference value in the Spectrum window.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq>` `:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	:DISP:EORF:VIEW2:WIND:TRAC:X:RLEV 0 :DISP:EORF:VIEW2:WIND:TRAC:X:RLEV?
Restriction and Notes	This parameter is only available when Meas Method is Swept.
Dependencies/Couplings	If the X_Auto_Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	935.2 MHz
State Saved	Saved in instrument state.
Min	Depends on instrument minimum frequency.
Max	Depends on hardware options and instrument maximum frequency.
Key Path	**SPAN X Scale**

Scale/Div

Allows you to set the display X scale/division value.

Mode	GSM

Key Path	**Scale/Div**

Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value in the RF Envelope window.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:EORF:VIEW:WIND:TRAC:X:PDIV 1ms
	:DISP:EORF:VIEW:WIND:TRAC:X:PDIV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset.
Dependencies/Couplings	If the X_Auto_Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	57.600 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**Span X Scale**

Scale/Div (Spectrum window)

Allows you to set the display X scale/division value in the Spectrum window.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq>`
	`:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`

Example	:DISP:EORF:VIEW2:WIND:TRAC:X:PDIV 1MHz :DISP:EORF:VIEW2:WIND:TRAC:X:PDIV?
Restriction and Notes	This parameter is only available when Meas Method is Swept.
Dependencies/Couplings	If the X_Auto_Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	360.000 kHz
State Saved	Saved in instrument state.
Min	100.000 kHz
Max	1.000 MHz
Key Path	**Span X Scale**

Ref Position

Allows you to set the display reference position to either Left, Center or Right.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:EORF:VIEW:WIND:TRAC:X:RPOS CENT :DISP:EORF:VIEW:WIND:TRAC:X:RPOS?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT | CENTer
State Saved	No
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:EORF:VIEW:WIND:TRAC:X:COUP 1
	:DISP:EORF:VIEW:WIND:TRAC:X:COUP?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept.
	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X_Ref_Value_–RF Envelope or X_Scale/Div – RF Envelope manually, X Auto Scaling automatically changes to Off
Dependencies/Couplings	See Restriction and Notes
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EORF:VIEW:WIND:TRAC:Y:RLEV –10
	:DISP:EORF:VIEW:WIND:TRAC:Y:RLEV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.
Dependencies/Couplings	When Y_Auto_Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00|0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:EORF:VIEW:WIND:TRAC:Y:PDIV 2 db
	:DISP:EORF:VIEW:WIND:TRAC:Y:PDIV?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.
Dependencies/Couplings	When Y_Auto_Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y_Auto_Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00|10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either 0(Top), 5(Center), or 10(Bottom).

Mode GSM

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EORF:VIEW:WIND:TRAC:Y:RPOS TOP
	:DISP:EORF:VIEW:WIND:TRAC:Y:RPOS?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP|TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EORF:VIEW:WIND:TRAC:Y:COUP ON
	:DISP:EORF:VIEW:WIND:TRAC:Y:COUP?
Restriction and Notes	This parameter is only available when Meas Method is Single Offset or Swept. Otherwise the key is blanked.
Dependencies/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 user sets a value either Y_Ref_Value or Y_Scale/Div manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:EORFspectr:ANNotation:TITLe:DATA <string>`
	`:DISPlay:EORFspectr:ANNotation:TITLe:DATA?`
Example	DISP:EORF:ANN:TITL:DATA “EDGE EVM”
	DISP:EORF:ANN:TITL:DATA?
Preset	EDGE Output RF Spectrum
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

There is no ‘Trace/Detector’ functionality supported in GMSK Output RF Spectrum so this front-panel key displays a blank menu key when pressed.

Mode	GSM
Key Path	**Front-panel key**

BW

There is no ‘BW’ functionality supported in GMSK Output RF Spectrum so this front-panel key displays a blank menu key when pressed.

Mode	GSM
Key Path	**Front-panel key**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On – Sets measurement averaging on.

Off – Sets measurement averaging off.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:AVERage:COUNt <integer>`
	`[:SENSe]:EORFspectr:AVERage:COUNt?`
	`[:SENSe]:EORFspectr:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EORFspectr:AVERage[:STATe]?`
Example	:EORF:AVER:COUN 3
	:EORF:AVER:COUN?
	:EORF:AVER ON
	:EORF:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	20
	ON
State Saved	Saved in instrument state.
Range	1 to 10000
Key Path	**Meas Setup**

Meas Type

Selects the measurement type.

KEYMod & Switch SCPIMSWitching	performs both Modulation and Switching measurements.
KEYModulation SCPIMODulation	measures the spectrum due to the 3/8pi shift 8PSK modulation and noise.
KEYSwitching SCPISWITching	measures the spectrum due to switching transients (burst ramping).
KEYFull Frame Modulation (FAST) SCPIFFModulation	improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active. When Full Frame Modulation (FAST) is selected only the multi-offset measurement method can be used; therefore the Meas Method defaults to multi-offset and the key is grayed out, and the Single Offset feature is not available.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:TYPE MODulation|MSWitching|SWITching|FFModulation` `[:SENSe]:EORFspectr:TYPE?`
Example	:EORF:TYPE MOD :EORF:TYPE?

Dependencies/Couplings	When Meas Method is set to MULTiple and this parameter is set to MODulation, the "Switching Meas BWs" and "FastPeakDet" keys are grayed out. When Meas Method is set to MULTiple and this parameter is set to SWITching, the “Fast Avg” (under Meas Setup), “Modulation Meas BWs” (under Advanced), “Min Freq Using Direct Time (under Advanced) and “Mod Avg” (under Advanced) keys are grayed out. When Meas Method is set to MULTiple and this parameter is set to MSWitching, the “Fast Avg” (under Meas Setup) and “FastPeakDet” (under Advanced) keys are grayed out. When Meas Method is set to SINGle and this parameter is set to MODulation, the “Switching Meas BWs” key (under Advanced) is grayed out. When Meas Method is set to SINGle and this parameter is set to SWITching, the “Fast Avg” (under Meas Setup), “Modulation Meas BWs” (under Advanced) and “Mod Avg” (under Advanced) keys are grayed out. When Meas Method is set to SINGle and this parameter is set to MSWitching, the “Fast Avg” (under Meas Setup) is grayed out. When Meas Method is set to SWEpt, the “Mod & Switch” (under Meas Type) and “Full Frame Mod(FAST)” (under Meas Type) keys are grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When Meas Method is set to SWEPt, parameter except for MODulation and SWITching would be ignored. When Meas_Method is set except for MULTiple, parameter FFModulation would be ignored.
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch | Modulation | Switching | Full Frame Mod (FAST)
Key Path	**Meas Setup**

Meas Method

Selects the measurement method.

KEYMulti-Offset SCPIMULTiple	the measurement is done at all offsets in the offset frequency list.
KEYSingle Offset (Examine) SCPISINGle	the measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
KEYSwept SCPISWEPt	the measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:MEASure MULTiple|SINGle|SWEPt` `[:SENSe]:EORFspectr:MEASure?`
Example	:EORF:MEAS SING :EORF:MEAS?
Dependencies/Couplings	When MULTiple is set, the following keys are grayed out. Single Offset Freq (Meas Setup) Wideband Noise (Meas Setup) Ref Pwr Avg (Advanced) When SINGle is set, the following keys are grayed out. Multi Offset Freq List (Meas Setup) Wideband Noise (Meas Setup) Min Freq Using Direct Time (Advanced) When SWEpt is set, the following keys are grayed out. Multi Offset Freq List (Meas Setup) Single Offset Freq (Meas Setup) Coupled with Select Modulation Method. See Remarks.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.When Meas Type is set to MSWitching, parameter SWEPt would be ignored. When Meas_Type is set to FFModulation, parameters SINGle and SWEPt would be ignored. When Meas Type is set to MSWitching, SWEPt would be ignored. When Meas Type is set to FFModulation, SINGle and SWEPt would be ignored. When MULTiple is set, “Select Modulation Method” is forced to DISCrete. When SWEPt is set, “Select Modulation Method” is forced to SWEep. When “Select Modulation Method” is set to DISCrete, this parameter is forced to MULTiple. When “Select Modulation Method” is set to SWEep and Meas Type is set to Modulation or Switching, this parameter is forced to SWEpt
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset | Single Offset (Examine) | Swept
Key Path	**Meas Setup**

Multi-Offset Freq List

Accesses a menu to chose the offset frequency list. You can select a Standard, Short, or Custom list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
  - Offset frequencies for modulation spectrum measurement
  - Corresponding resolution bandwidths for each of the modulation offset frequencies
  - Offset frequencies for switching transient spectrum measurement
  - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFspectr subsystem.
- STANdard - the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFspectr subsystem.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:SELect CUSTom|SHORt|STANdard`
	`[:SENSe]:EORFspectr:LIST:SELect?`
Example	:EORF:LIST:SEL CUST
	:EORF:LIST:SEL?
Restriction and Notes	This softkey available only when Meas Method is set to 'Multi-Offset'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SHORt
State Saved	Saved in instrument state.
Range	Standard | Short | Custom
Key Path	**Meas Setup**

Single Offset Freq

Selects a frequency offset from the carrier at which to perform a single offset Output RF Spectrum measurement.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:OFRequency <freq>`
	`[:SENSe]:EORFspectr:OFRequency?`
Example	:EORF:OFR 250kHz
	:EORF:OFR?
Restriction and Notes	This softkey is available only when Meas Method is set to 'Single Offset (Examine)'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	–12.0 MHz
Max	+12.0 MHz
Key Path	**Meas Setup**

Wideband Noise

Sets wideband noise function to ON or OFF. When set to OFF, the analyser is tuned to the carrier, and –1800 kHz to +1800 kHz either side of the center frequency is swept. When set to ON, the whole of the relevant band, plus 2 MHz on either side, is swept.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:WBNoise ON|OFF|1|0`
	`[:SENSe]:EORFspectr:WBNoise?`
Example	:EORF:WBN ON
	:EORF:WBN?
Dependencies/Couplings	This key available only when Meas Method is 'Swept'. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

Fast Avg

Used to change On/Off state of Fast Avg.

The fast averaging is active only when averaging is on, and only when the modulation results are being measured. If both modulation and switching transients results are being measured, then the measurement uses the default averaging.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:AVERage:FAST[:STATe] OFF|ON|0|1`
	`[:SENSe]:EORFspectr:AVERage:FAST[:STATe]?`
Example	:EORF:AVER:FAST ON
	:EORF:AVER:FAST?
Dependencies/Couplings	This key is available when 'Modulation' is selected on Meas Type and Meas Method is not SWEPt. Otherwise grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More**

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Dependencies/Couplings	The advanced menu is not available when Meas Method is Swept and the Advanced key is blanked.

Key Path	**Meas Setup, More**

Modulation Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)
- >=1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when Meas Type is Switching orMulti-Offset Freq List is Custom.

Key Path	**Meas Setup, More, Advanced**

< 1800 kHz Offset RBW (for Modulation Meas BWs) Sets the resolution bandwidth used for the spectrum due to modulation part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>`
	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?`
Example	:EORF:BAND:MOD:OFFS:CLOS 30 kHz
	:EORF:BAND:MOD:OFFS:CLOS?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Meas BWs**

>= 1800 kHz Offset RBW (for Modulation Meas BWs) Sets the resolution bandwidth used for the spectrum due to modulation part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR <freq>`
	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`
Example	:EORF:BAND:RES:MOD:OFFS:FAR 30 kHz
	:EORF:BAND:RES:MOD:OFFS:FAR?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Meas BWs**

Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)
- >=1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when Meas Type is Modulation or Full Frame Mod, or when Multi-Offset Freq is Custom.

Key Path	**Meas Setup, More, Advanced**

Carrier RBW (for Switching Meas BWs) Sets the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier <freq>`
	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?`
Example	:EORF:BAND:SWIT:CARR 30e3
	:EORF:BAND:SWIT:CARR?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

< 1800 kHz Offset RBW (for Switching Meas BWs) Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>`
	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?`
Example	:EORF:BAND:RES:SWIT:OFFS:CLOS 30 kHz
	:EORF:BAND:RES:SWIT:OFFS:CLOS?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz

State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

>= 1800 kHz Offset RBW (for Switching Meas BWs) Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?`
Example	:EORF:BAND:RES:SWIT:OFFS:FAR 30e3 :EORF:BAND:RES:SWIT:OFFS:FAR?
Restriction and Notes	This parameter is only used with the Multi-Offset Freq List Standard or Short lists, and not with the Custom list.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Meas BWs**

Modulation Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Modulation | Full Frame Mod
- Meas Method: Multi Offset

- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, More, Advanced**

Offset Selects the offset pairs (upper and lower) that affect the menu keys and displays the momery selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Mode	GSM
Key Path	**Meas Setup, More, Advanced**

Offset Freq This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency.

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency]?`
	`[:SENSe]:EORFspectr:LIST:MODulation: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:EORFspectr:LIST:MODulation:STATe?`

Example	:EORF:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5
	:EORF:LIST:MOD:FREQ?
	:EORF:LIST:MOD:STAT ON, ON, ON
	:EORF:LIST:MOD:STAT?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0
	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Res BW Defines the custom set of resolution bandwidths for the modulation spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each list must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth?`
Example	:EORF:LIST:MOD:BAND 10e3, 20e3, 10e3
	:EORF:LIST:MOD:BAND?
Remote Command Notes	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST.
	You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.

Preset	3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,1.000000000E+05,1.000000000E+05,1.000000000E+05,1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Rel Limit Level Offset Defines the custom set of level offsets for the modulation spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Mode	GSM

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>,`
	`<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,`
	`<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,`
	`<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>`
	
	`[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?`

Example	:EORF:LIST:MOD:LOFF:RCAR 0.0, –2.0, –5.0 :EORF:LIST:MOD:LOFF:RCAR?
Restriction and Notes	The menu key is grayed out when Offset is A. The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0

Max	200.0
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Abs Limit Level Offset This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute?`
Example	:EORF:LIST:MOD:LOFF:ABS 0.0, –2.0, –5.0 :EORF:LIST:MOD:LOFF:ABS?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Apply Level Offset

KEYRel SCPIRELative	Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. Standard-defined modulation relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYAbs SCPIABSolute	Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. Standard-defined modulation absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:EORFspectr:LIST:MODulation:APPLy?`
Example	:EORF:LIST:MOD:APPL REL, REL, REL :EORF:LIST:MOD:APPL?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel | Both | Abs
Key Path	**Meas Setup, More, Advanced, Modulation Custom Offset & Limits**

Switching Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, More, Advanced**

Offset Freq Defines the custom set of offset frequencies at which the switching transient spectrum part of the EORFspectr measurement is made.

The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power is measured at both the lower and upper offsets. Up to 14 offset frequencies, plus the 0 Hz carrier frequency, may be defined.

For the BAF SCPI command:

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Mode	GSM

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?`
	`[:SENSe]:EORFspectr:LIST:SWITching: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:EORFspectr:LIST:SWITching:STATe?`
Example	:EORF:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5
	:EORF:LIST:SWIT:FREQ?
	:EORF:LIST:SWIT:STAT ON, ON, ON
	:EORF:LIST:SWIT:STAT?
Restriction and Notes	The menu key is grayed out when Offset is A.
	This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Res BW Defines the custom set of resolution bandwidths for the switching transient spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the

switching offset frequency list. The number of items in each list must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth?`
Example	:EORF:LIST:SWIT:BAND 1e3, 1e3,1e3 :EORF:LIST:SWIT:BAND?
Remote Command Notes	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST. You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.
Preset	3.000000000E+05,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Rel Limit Level Offset Defines the custom set of level offsets for the switching transient spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier]?`

Example	:EORF:LIST:SWIT:LOFF:RCAR 0.0, –2.0, –5.0 :EORF:LIST:SWIT:LOFF:RCAR?
Restriction and Notes	The menu key is grayed out when Offset is A. The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Abs Limit Level Offset This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute?`
Example	:EORF:LIST:SWIT:LOFF:ABS 0.0, –2.0, –5.0 :EORF:LIST:SWIT:LOFF:ABS?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0

State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Apply Level Offset

KEYRel SCPIRELative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYAbs SCPIABSolute	Only Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. Standard-defined switching absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Mode	GSM

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute`
	`[:SENSe]:EORFspectr:LIST:SWITching:APPLy?`
Example	:EORF:LIST:SWIT:APPL REL, REL, REL
	:EORF:LIST:SWIT:APPL?
Restriction and Notes	The menu key is grayed out when Offset is A.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel | Both | Abs
Key Path	**Meas Setup, More, Advanced, Switching Custom Offsets & Limits**

Min Freq Using Direct Time

Selects the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and is faster for measuring at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz). It is much faster for measuring at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the Direct Time method does not. The use of 5-pole sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:BFRequency <freq>`
	`[:SENSe]:EORFspectr:BFRequency?`
Example	:EORF:BFR 600e3

Dependencies/Couplings	This softkey is grayed out unless Meas Method is set to MULTiple and Meas Type is set to MSWitching or MODulation.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	2MHz
Key Path	**Meas Setup, More, Advanced**

Fast Peak Det

Sets the detection mode to “fast peak”.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:DETector:SWITching:FAST[:STATe] ON|OFF|1|0` `[:SENSe]:EORFspectr:DETector:SWITching:FAST[:STATe]?`
Example	:EORF:DET:SWIT:FAST ON
Dependencies/Couplings	This key is active when Meas Type is ‘Switching’ and Meas Method is ‘Multi-Offset’. Otherwise, grayed out.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, More, Advanced**

Ref Pwr Avg

Specifies how many averages to use when measuring the reference power.

Set to ON to use the same number of averages as specified in the number of bursts averaged command.

Set to OFF to use the number specified in the reference power averages command.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:REFerence:AVERage:COUNt <integer>`
	`[:SENSe]:EORFspectr:REFerence:AVERage:COUNt?`
	`[:SENSe]:EORFspectr:REFerence:AVERage[:AUTO] ON|OFF|1|0`
	`[:SENSe]:EORFspectr:REFerence:AVERage[:AUTO]?`
Example	:EORF:REF:AVER:COUN 10
	:EORF:REF:AVER:COUN?
	:EORF:REF:AVER OFF
	:EORF:REF:AVER?
Restriction and Notes	This softkey is grayed out unless Meas Method is set to Single Offset.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Key Path	**Meas Setup, More, Advanced, More**

Mod Avg

Selects the type of averaging for measuring the modulation spectrum. This is an advanced control that normally does not need to be changed.

Setting this to a value other than the factory default may cause invalid measurement results.

KEYLog-Pwr Avg (Video) SCPILOG	The log of the power is averaged. (This is also known as video averaging.)
KEYPwr Avg (RMS) SCPIRMS	The power is averaged, providing the rms of the voltage.

Mode	GSM
Remote Command	`[:SENSe]:EORFspectr:AVERage:MODulation:TYPE LOG|RMS`
	`[:SENSe]:EORFspectr:AVERage:MODulation:TYPE?`
Example	:EORF:AVER:MOD:TYPE LOG
	:EORF:AVER:MOD:TYPE?
Restriction and Notes	This softkey is grayed out when Meas Type is set to Switching.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LOG
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Key Path	**Meas Setup, More, Advanced, More**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	`:CONFigure:EORFspectr`
Example	:CONF:EORF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup, More**

Select Modulation Method (Backwards Compatibility/Remote Command Only)

Mode	GSM

Remote Command	`[:SENSe]:EORFspectr:TYPE:MODulation[:METHod] DISCrete|SWEep` `[:SENSe]:EORFspectr:TYPE:MODulation[:METHod]?`
Example	EORF:TYPE:MOD SWE EORF:TYPE:MOD?
Restriction and Notes	This parameter is available only when Meas Type is set to MODulation or SWITching.
Dependencies/Couplings	Coupled with Meas Type and Meas Method. See SCPI Remarks.
Remote Command Notes	The legacy parameter [:SENSe]:EORFspectr:TYPE:MODulation[:METHod] DISCrete | SWEep is aliased to the new command [:SENSe]:EORFspectr:MEASure MULTiple | SWEPt. When Meas Method is set to MULTiple, this parameter is forced to DISCreate. When Meas Method is set to SWEpt, this parameter is forced to SWEep. When this parameter is set to DISCreate, Meas Method is forced to MULTiple. When this parameter is set to SWEep and Meas Type is set to MODulation or SWITching., Meas Method is forced to SWEpt
Preset	DISC
State Saved	Saved in instrument state.

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See Triggers in the "Measurement Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Trig Source

Allows you to choose a trigger source. Trigger settings are mode global. Refer to Mode functionality section for trigger settings.

KEY:Free Run (Immediate) SCPI:IMMediate	The trigger occurs at the time the data is requested, completely asynchronous to the RF or IF signal. (also called free run)
KEY:Video SCPI:VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of tl passed by the IF.
KEY:LINE SCPI:LINE	Triggers on the power line signal.
KEY:External 1 SCPI:EXTernal[1]	Activates the external 1 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:External 2 SCPI:EXTernal2	Activates the external 2 trigger input. The external trigger must be a signal between 5 and +5 volts.
KEY:RF Burst (Wideband) SCPI:RFBurst	An internal wideband RF burst trigger that has an automatic level control for burst signals. It triggers on a level that is relative to the peak of the signal passed by the RF or absolute level.
KEY:Periodic Timer SCPI:FRAMe	Uses the internal periodic timer (used to called 'frame clock') to generate a trigger signal.

Mode	GSM
Remote Command	`:TRIGger:EORFspectr[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo`
	`:TRIGger:EORFspectr[:SEQuence]:SOURce?`
Example	TRIG:EORF:SOUR EXT
	TRIG:EORF:SOUR?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run(Immediate) | Video | Line | External 1 | External 2 | RF Burst (Wideband) | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section.

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specified the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:EORF:MARK:MODE OFF
	:CALC:EORF:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value, using 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	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:EORF:MARK3:X 0 :CALC:EORF:MARK3:X?

Restriction and Notes	If no suffix is sent , uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max/Min value would be changed by Sweep Time or Frequency Span.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37.
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:EORFspectr:MARK10:X:POS 0 :CALC:EORFspectr:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.

Dependencies/Couplings	Max/Min value would be changed by Sweep Time or Frequency Span.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:EORFspectr:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0

State Saved	No

Properties

Accesses a menu that allow you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Select Marker

Specified the selected marker.

Mode	GSM
Key Path	**Marker, Properties**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:EORF:MARK:REF 10
	:CALC:EORF:MARK:REF?
Restriction and 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.”

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value is 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFEMod|RFESwitching|SPEMod|LIMMod` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:EORF:MARK:TRACE RFES :CALC:EORF:MARK:TRACE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation | RF Envelope Switching | Swp Spectrum Modulation | Limit Modulation
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EORFspectr:MARKer:COUPle[:STATe]?`
Example	:CALC:EORF:MARK:COUP ON :CALC:EORF:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer:AOFF`
Example	:CALC:EORFspectr:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

Peak Search

Pressing Peak Search front-panel key performs a peak search and opens this Peak Search menu. Peak Search places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	GSM
Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`:CALC:EORF:MARK2:MAX`
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

14 EDGE TX Band Spur

This measurement checks that the transmitter does not transmit undesirable energy into the transmit band. This energy may cause interference for other users of the GSM system.

This measurement is only available for the base station. The transmitter should be set at its maximum output power on all time slots.

Remote Command Results:

The following commands can be used to retrieve the measurement results:

```
:CONFigure:ETSPur
```

```
:CONFigure:ETSPur:NDEFault
```

```
:INITiate:ETSPur
```

```
:FETCh:ETSPur[n]?
```

```
:READ:ETSPur[n]?
```

```
:MEASure:ETSPur[n]?
```

n	Results Returned
not specified or n = 1	Returns 3 comma-separated scalar results: The worst spur's frequency difference from channel center frequency (in MHz) The worst spur's amplitude difference from the limit (in dB) The worst spur's amplitude difference from the mean transmit power (in dB)
2	Returns trace of the current segment spectrum.
3	Returns trace of the current segment Upper Limit.
4	Returns trace of Lowest segment Spectrum.
5	Returns trace of Lowest segment Upper Limit.
6	Returns trace of Lower Adj segment Spectrum.
7	Returns trace of Lower Adj segment Upper Limit.
8	Returns trace of Upper Adj segment Spectrum.
9	Returns trace of Upper Adj segment Upper Limit.
10	Returns trace of Highest segment Spectrum.
11	Returns trace of Highest segment Upper Limit.

12	1. The mean transmit power. 2. The spur's frequency offset from channel center frequency (in MHz) on Lowest region. 3. The spur's amplitude difference from the limit (in dB) on Lowest region. 4. The spur's amplitude difference from the mean transmit power (in dBc) on Lowest region. 5. The spur's frequency offset from channel center frequency (in MHz) on Lower region. 6. The spur's amplitude difference from the limit (in dB) on Lower region. 7. The spur's amplitude difference from the mean transmit power (in dBc) on Lower region. 8. The spur's frequency offset from channel center frequency (in MHz) on Upper region. 9. The spur's amplitude difference from the limit (in dB) on Upper region. 10. The spur's amplitude difference from the mean transmit power (in dBc) on Upper region. 11. The spur's frequency offset from channel center frequency (in MHz) on Highest region. 12. The spur's amplitude difference from the limit (in dB) on Highest region. 13. The spur's amplitude difference from the mean transmit power (in dBc) on Highest region. 14. Reserved 15. Reserved 16. Reserved 17. Reserved 18. Reserved Note: –999.0 is retuned if the region can not be specified due to the band limit.

SPAN X Scale

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Mode	GSM
Key Path	**Front-panel key**

Ref Value

Allows you to set the absolute power reference.

Mode	GSM
Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:ETSP:VIEW:WIND:TRAC:Y:RLEV –10
	:DISP:ETSP:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When you set a value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement. See Attenuation under AMPTD Y Scale in the "Measurement Setup Functions" section for more information.

Key Path	**AMPTD/Y Scale**

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Mode	GSM
Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:ETSP:VIEW:WIND:TRAC:Y:PDIV 10
	:DISP:ETSP:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When you set a value manually, Y Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Key Path	**AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See Presel Center under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

See Presel Adjust under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale**

Internal Preamp

Accesses a menu that enables you to control the internal preamplifiers. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement. See Internal Preamp under AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

Key Path **AMPTD/Y Scale, More**

Ref Position

Allows you to set the display reference position to either Top, Center or Bottom.

Mode GSM

Remote Command	:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom
	:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
Example	:DISP:ETSP:VIEW:WIND:TRAC:Y:RPOS CENT
	:DISP:ETSP:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale, More**

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Mode	GSM
Remote Command	:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON
	:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
Example	:DISP:ETSP:VIEW:WIND:TRAC:Y:COUP 1
	:DISP:ETSP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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 user sets a value either Y Ref Value or Y Scale/Div manually, this parameter is set to 'Off' automatically.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale, More**

View/Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Mode	GSM
Key Path	**Front Panel**

Change Title

Writes a title into the "measurement name" field in the banner. See the “Analyzer Setup Functions” section for more information.

Mode	GSM
Remote Command	`:DISPlay:ETSPur:ANNotation:TITLe:DATA <string>`
	`:DISPlay:ETSPur:ANNotation:TITLe:DATA?`
Example	DISP:ETSP:ANN:TITL:DATA “EDGE EVM”
	DISP:ETSP:ANN:TITL:DATA?
Preset	EDGE Tx Band Spur
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View Selection

Change the content of the spectrum window. The measurement splits the transmit band into four segments (or less if the currently selected ARFCN is at the edge of the band). Two of these segments are on each side of the ETSI specified transmit band. View selection allows you to select each segment in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).

- Lowest Segment – lower Tx band edge to –6 MHz offset from the channel frequency
- Lower Adj Segment – –6 MHz to –1.8 MHz offset from the channel frequency
- Upper Adj Segment – +1.8 MHz to +6 MHz offset from the channel frequency
- Highest Segment – +6 MHz offset from the channel frequency to the upper Tx band edge

[DEForce Restart	No
Mode	GSM
Restriction and Notes	Dynamically changed in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).
Preset	Lower Segment
State Saved	No
Range	Lowest Segment | Lower Adj Segment | Upper Adj Segment | Highest Segment
Key Path	**View/Display**

Trace/Detector

Accesses a menu that allows you to control trace settings.

Mode	GSM
Key Path	**Front-panel key**

Trace

Select the trace mode from the following selections:

KEYAvg SCPIAVERage	Trace would be averaged.
KEYMax Hold SCPIMAXHold	Trace would hold maximum value.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:TRACe AVERage|MAXHold` `[:SENSe]:ETSPur:TRACe?`
Example	:ETSP:TRAC MAXH :ETSP:TRAC?
Restriction and Notes	Valid only when Averaging State is set to On.
Dependencies/Couplings	Coupled with Average Type.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	`MAXHold`
State Saved	Saved in instrument state.
Range	Avg|Max Hold
Key Path	**Trace/Detector**

BW

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Mode	GSM
Key Path	**Front Panel**

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

OnSets measurement averaging on.

OffSets measurement averaging off.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:AVERage:COUNt <integer>`
	`[:SENSe]:ETSPur:AVERage:COUNt?`
	`[:SENSe]:ETSPur:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ETSPur:AVERage[:STATe]?`
Example	:ETSP:AVER:COUN 3
	:ETSP:AVER:COUN?
	:ETSP:AVER ON
	:ETSP:AVER?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30
State Saved	Saved in instrument state.
Min	1
Max	10000
Key Path	**Meas Setup**

Avg Mode

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.

KEYExponential SCPIEXPonential	Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.
KEYRepeat SCPIREPeat	After reaching the average count, the averaging is reset and a new average is started.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:ETSPur:AVERage:TCONtrol?`
Example	:ETSP:AVER:TCON REP :ETSP:AVER:TCON?
Restriction and Notes	Valid only when Averaging State is set to On.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Avg Type

Select the type of averaging.

LOG – The log of the power is averaged. (This is also known as video averaging.)

MAXimum – The maximum values are retained. Remove from MUI.

RMS – The power is averaged, providing the rms of the voltage.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:AVERage:TYPE LOG|MAXimum|RMS`
	`[:SENSe]:ETSPur:AVERage:TYPE?`
Example	:ETSP:AVER:TYPE RMS
	:ETSP:AVER:TYPE?
Restriction and Notes	MAXimum is SCPI only, no MUI.
	This key is grayed out then Trace is set to Max Hold.
Dependencies/Couplings	Selecting 'MAXimum' via SCPI force to change state of Trace to 'MAXHold'.
	Selecting 'LOG' or 'RMS' force to change state of Trace to 'AVERage'.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) | Log-Pwr Avg (Video)
Key Path	**Meas Setup**

Meas Type

Select the measurement type from the following selections:

KEYFull SCPIFULL	In Continuous Measure, it repeatedly does full search of all segments.
KEYExamine SCPIEXAMine	In Continuous Measure, after doing one full search across all segments, it parks on the worst segment and continuously updates that segment.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:TYPE EXAMine|FULL`
	`[:SENSe]:ETSPur:TYPE?`

Example	:ETSP:TYPE FULL :ETSP:TYPE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	FULL
State Saved	Saved in instrument state.
Range	Examine|Full
Key Path	**Meas Setup**

IF Gain

In order to take full advantage of the RF dynamic range of the analyzer, we will offer a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, More, Advanced,**

IF Gain Auto

Activates the auto rules for IF Gain. Auto rules would be set IF Gain to Low Gain.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:ETSPur:IF:GAIN:AUTO[:STATe]?`
Example	:ETSPur:IF:GAIN:AUTO ON :ETSPur:IF:GAIN:AUTO?
Dependencies/Couplings	Couple to IF Gain State.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man

Key Path	**Meas Setup**

IF Gain State

Selects the range of IF gain.

Mode	GSM
Remote Command	`[:SENSe]:ETSPur:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:ETSPur:IF:GAIN[:STATe]?`
Example	:ETSPur:IF:GAIN ON
	:ETSPur:IF:GAIN?
Dependencies/Couplings	Couple to IF Gain Auto force it to Man.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	where ON = high gain
	OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup**

Limit

Set the value for the test limit. This command does not accept units. Use :CALCulate:ETSPur:LIMit:TEST to select the units dBm (absolute) or dB (relative).

dBm – Absolute limit

dBc – Relative to Mean Transmit Power.

Mode	GSM

Remote Command	:CALCulate:ETSPur:LIMit[:UPPer][:DATA] <real>
	:CALCulate:ETSPur:LIMit[:UPPer][:DATA]?
	:CALCulate:ETSPur:LIMit:TEST ABSolute|RELative
	:CALCulate:ETSPur:LIMit:TEST?
Example	:CALC:ETSP:LIM –10
	:CALC:ETSP:LIM?
	:CALC:ETSP:LIM:TEST ABS
	:CALC:ETSP:LIM:TEST?
Dependencies/Couplings	Selection of Front Panel Unit/Terminator Key would change this BAF parameter, absolute or relative. If you select dBm for terminator, BAF parameter should be changed to ABSolute(dBm).
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–36.00
State Saved	Saved in instrument state.
Min	–200
Max	100
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	GSM
Remote Command	:CONFigure:ETSPur
Example	:CONF:ETSP
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup**

Trigger

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Sweep/Control

Sweep/Control functionality that is common across measurements is described in the Measurement Functions section. (for example, Pause/Resume) The Sweep Time functionality described below is unique to this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See “Marker Functions” section for information on features that are common.

Mode	GSM
Key Path	**Front Panel**

Select Marker

Specifies the selected marker.

Key Path	**Marker**

Marker Type

Sets the marker control mode Normal, Delta and Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE POSition|DELTa|OFF`
	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE?`
Example	:CALC:ETSP:MARK:MODE OFF
	:CALC:ETSP:MARK:MODE?

Restriction and 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.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

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	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X <real>` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X?`
Example	:CALC:ETSP:MARK3:X 0 :CALC:ETSP:MARK3:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is Not A Number (NAN).
Dependencies/Couplings	Max value would be changed.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

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	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition <integer>` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition?`
Example	:CALC:ETSP:MARK10:X:POS 10 :CALC:ETSP:MARK10:X:POS?
Restriction and 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**. If the marker is **Off** the response is not a number.
Dependencies/Couplings	Max value would be changed.

Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
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	–9.9E37
Max	9.9E37

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :Y?`
Example	:CALC:ETSPur:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only command.
Preset	0
State Saved	No

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	**Marker**

Select Marker

Specifies the selected marker.

Key Path	**Marker, Properties**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :REFerence <integer>`
	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :REFerence?`
Example	:CALC:ETSP:MARK:REF 5
	:CALC:ETSP:MARK:REF?
Restriction and 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.”
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	When queried a single value is 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe SPECtrum|ULIMit` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe?`
Example	:CALC:ETSP:MARK:TRACE ULIM :CALC:ETSP:MARK:TRACE?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SPECtrum
State Saved	Saved in instrument state.
Range	Spectrum | Upper Limit
Key Path	**Marker, Properties**

Couple Marker

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).

This may result in markers going off screen.

Mode	GSM

Remote Command	`:CALCulate:ETSPur:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ETSPur:MARKer:COUPle[:STATe]?`
Example	:CALC:ETSP:MARK:COUP ON :CALC:ETSP:MARK:COUP?
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker, More**

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer:AOFF`
Example	:CALC:ETSPur:MARK:AOFF
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, More**

Peak Search

Pressing Peak Search front-panel key performs a peak search and opens this Peak Search menu. Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	GSM
Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MAXimum`
Example	`:CALC:ETSP:MARK2:MAX`
Remote Command Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Peak Search**

Marker To

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

Marker Function

There is no function for this front-panel key in this measurement.

Mode	GSM
Key Path	**Front Panel**

15 Monitor Spectrum

The monitor spectrum measurement is used as a quick, convenient means of looking at the entire spectrum. While the look and feel are similar to the Spectrum Analyzer mode, the functionality is greatly reduced for easy operation. The main purpose of the measurement is to show the spectrum. The default span should cover an appropriate frequency range of the application.

Key Path **Meas**

Remote Command Results

The following commands can be used to retrieve the measurement results:

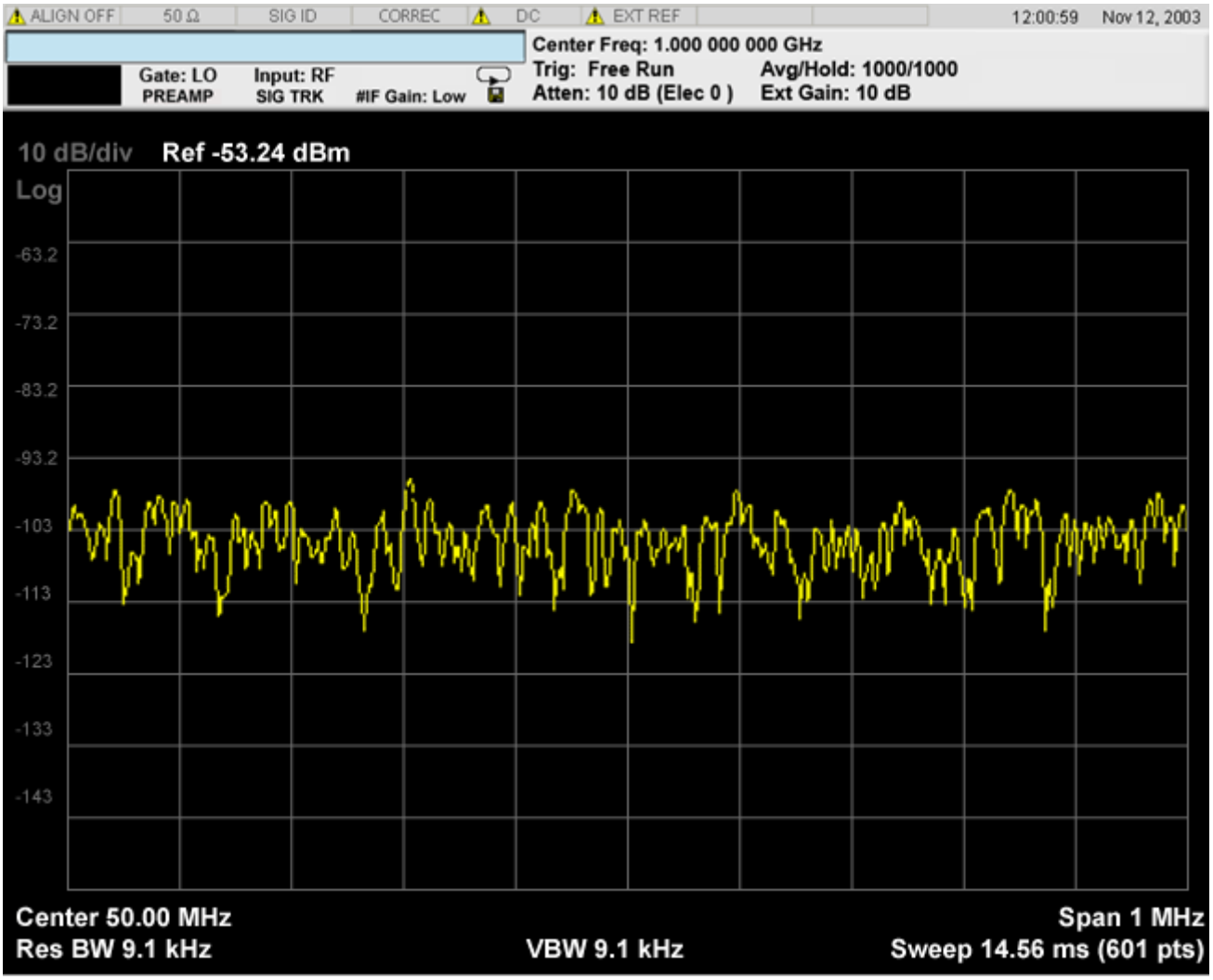
```
:CONFigure:MONitor
:CONFigure:MONitor:NDEFault
:INITiate:MONitor
:FETCh:MONitor[n]?
:READ:MONitor[n]?
:MEASure:MONitor[n]?
```

n	Results Returned
n=1 (or not specified)	Returns trace1 data with comma separated floating numbers
n=2	Returns trace2 data with comma separated floating numbers
n=3	Returns trace3 data with comma separated floating numbers

Measurement Results and Views

There is a single trace view for this measurement.

Spectrum View



Measurement Results

The measurement has no results, but has a number of features that make it flexible and simple to use.

Span X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	**Front-panel key**

Span

Changes the frequency range symmetrically about the center frequency.

Mode	All except SA, BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN <freq>`
	`[:SENSe]:MONitor:FREQuency:SPAN?`
Example	:MON:FREQ:SPAN 1 MHz
	:MON:FREQ:SPAN?
Dependencies/Couplings	Changing the span causes the resolution bandwidth to change automatically, and affects data acquisition time.
Preset	WCDMA: 10.0 MHz
	WIMAX OFDMA: 50.0 MHz
	C2K: 2.5MHz
	PN: 1.0 MHz
	GSM/EDGE: 1.0 MHz
	TD-SCDMA: 3.2 MHz
	1xEVDO: 1.25MHz
State Saved	Saved in instrument state.
Min	10 Hz

Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz
Key Path	**Span X Scale**

Full Span

Changes the Span to show the full frequency range of the analyzer.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:FULL`
Example	:MON:FREQ:SPAN:FULL
Dependencies/Couplings	Sets the span to the full frequency range, and adjusts the center frequency accordingly.
Key Path	**Span X Scale**

Last Span

Changes the measurement span to the span setting of the previous measurement. If there is no existing previous span value, then the span remains unchanged.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:PREVious`
Example	:MON:FREQ:SPAN:PREV
Dependencies/Couplings	Selecting last span changes the measurement span value.
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	**Front-panel key**

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.

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:MON:VIEW:WIND:TRAC:Y:RLEV 2.0
	:DISP:MON:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/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
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings.

See AMPTD Y Scale, Attenuation in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

Scale/Div

Sets the logarithmic units per vertical graticule division on the 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.

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:MON:VIEW:WIND:TRAC:Y:PDIV 5.0 dB
	:DISP:MON:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/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.
Range	0.10 dB to 20.00 dB
Key Path	**AMPTD Y Scale**

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, Internal Preamp in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

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.

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:MON:VIEW:WIND:TRAC:Y:RPOS CENT
	:DISP:MON:VIEW:WIND:TRAC:Y:RPOS?
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Key Path	**AMPTD Y Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:MON:VIEW:WIND:TRAC:Y:COUP ON
	:DISP:MON:VIEW:WIND:TRAC:Y:COUP?
Dependencies/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
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu of functions that enable you to control certain functions related to the display of the analyzer.

Key Path	**Front-panel key**

Display

Accesses a menu of functions that enable you to set the display parameters.

See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**View/Display**

Change Title

Accesses an Alpha Editor menu that enables you to write a title across the top of the display. This menu contains characters and symbols that may also be used with the numeric keypad. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title remains until you press Change Title again, or you recall a trace or state, or a Factory Preset is performed. A title can also be cleared by pressing Title, Clear Title.

Pressing this key cancels any active function.

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:ANNotation:TITLe:DATA <string>`
	`:DISPlay:MONitor:ANNotation:TITLe:DATA?`
Example	DISP:MON:ANN:TITL:DATA “Agilent”
	DISP:MON:ANN:TITL:DATA?
Preset	Monitor Spectrum
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

Accesses a menu that enables you to control the display, storage, detection and manipulation of trace data. Each trace is comprised of a series of data points in which X and Y axis information is stored. The analyzer updates the information for the active trace with each sweep of the current measurement.

Key Path	**Front-panel key**

Select Trace

Allows you to select which trace you want to use for the current measurement. You can select one of three traces. Monitor Spectrum supports 3 traces, numbered 1 through 3.

Mode	All except SA and BASIC
Preset	Trace 1
State Saved	The number of the selected trace is saved in Instrument State
Range	1 – 3
Key Path	**Trace/Detector**

Trace Type

Allows you to select the type of trace you want to you use for the current measurement. You can assign a trace type to one of the three available traces.

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.

Mode	All except SA and BASIC
Remote Command	`:TRACe[1]|2|3:MONitor:TYPE WRITe|AVERage|MAXHold|MINHold`
	`:TRACe[1]|2|3:MONitor:TYPE?`
Remote Command Notes	`WRITe` = Clear Write
	`AVERage` = Average
	`MAXHold` = Maximum Hold
	`MINHold` = Minimum Hold

Preset	WRITe
State Saved	Saved in instrument state.
Range	`WRITe|AVERage|MAXHold|MINHold for traces 1 through 3`
Key Path	**Trace/Detector**

Update

Toggles a trace state between Update and Off. The Off selection makes the trace inactive (or a stored trace). This does not affect whether the trace is visible or not. Use the Display Show/Blank function to change the trace visibility.

Mode	All except SA and BASIC
Remote Command	`:TRACe[1]|2|3:MONitor:UPDate[:STATe] ON|OFF|0|1`
	`:TRACe[1]|2|3:MONitor:UPDate[:STATe]?`
Example	:TRAC3:MON:UPD OFF
	:TRAC3:MON:UPD?
Preset	ON
State Saved	Saved in instrument state.
Range	`ON|OFF|0|1`
Key Path	**Trace/Detector**

Display

Controls the visibility of a trace. In **Blank**, traces do not display nor appear on printouts but are otherwise unaffected. They may be queried and markers may be placed on them

Mode	All except SA and BASIC
Remote Command	`:TRACe[1]|2|3:MONitor:DISPlay[:STATe] ON|OFF|0|1`
	`:TRACe[1]|2|3:MONitor:DISPlay[:STATe]?`
Example	:TRAC:MON:DISP ON
	:TRAC:MON:DISP?
Preset	ON|OFF|OFF

State Saved	Saved in instrument state.
Range	`ON|OFF|0|1`
Key Path	**Trace/Detector**

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.

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 represent 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.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:DETector:TRACe AVERage|NEGative|NORMal|POSitive|SAMPle`
	`[:SENSe]:MONitor:DETector:TRACe?`
Example	:MON:DET:TRAC NORM
	:MON:DET:TRAC?
Dependencies/Couplings	When the Detector choice is Auto, the detector selected depends on average type.

Remote Command Notes	The query returns a name that corresponds to the detector type as shown below. String Returned Definition NORM Normal AVER Average POS Peak SAMP Sample NEG Negative Peak
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Average|Peak|Sample|Negative Peak
Key Path	**Trace/Detector**

Auto

Sets the detector for the currently selected trace to 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.

Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:DETector:AUTO ON|OFF|1|0`
	`[:SENSe]:MONitor:DETector:AUTO?`
Example	:MON:DET:AUTO OFF
	:MON:DET:AUTO?
Dependencies/Couplings	When the Detector choice is Auto, the detector selected depends on average state and trace type.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Trace/Detector**
	Trace/Detector, Detector

Clear Trace

Clears the selected trace from the display.

Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar [TRACE1]|TRACE2|TRACE3`
Example	:TRAC:MON:CLE
Key Path	**Trace/Detector**

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:CLEar`
Example	:DISP:MON:VIEW:WIND:TRAC:CLE
Key Path	**Trace/Detector**

Clear All Traces

Clears all traces from the display.

Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar:ALL`
Example	:TRAC:MON:CLE:ALL
Key Path	**Trace/Detector**

BW

Accesses a menu that enables you to specify the resolution bandwidth functions that control the bandwidth and filter selection.

Key Path	**Front-panel key**

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.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:BANDwidth[:RESolution] <freq>`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]?`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:BANDwidth[:RESolution]:AUTO?`
Example	:MON:BAND 2.4 MHz
	:MON:BAND?
	:MON:BAND:AUTO ON
	:MON:BAND:AUTO?
Preset	WCDMA: Automatically calculated
	WIMAX OFDMA: 100kHz
	C2K: Automatically calculated
	PN: Automatically calculated
	GSM/EDGE: Automatically calculated
	TD-SCDMA: Automatically calculated
	1xEVDO: Automatically calculated
State Saved	Saved in instrument state.
Min	1.0 Hz
Max	8.0 MHz
MIN/MAX/DEF Support	Yes
Key Path	**BW**

Video BW

Changes the analyzer post–detection filter.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:MONitor:BANDwidth:VIDeo?`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO?`
Example	:MON:BAND:VID 10 MHz
	:MON:BAND:VID?
	:MON:BAND:VID:AUTO OFF
	:MON:BAND:VID:AUTO?
Preset	WCDMA: Automatically calculated
	WIMAX OFDMA: 1MHz
	C2K: Automatically calculated
	PN: Automatically calculated
	GSM/EDGE: Automatically calculated
	TD-SCDMA: Automatically calculated
	1xEVDO: Automatically calculated
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
MIN/MAX/DEF Support	Yes
Key Path	**BW**

VBW:3dB RBW

Selects the ratio between the video bandwidth and the equivalent 3 dB resolution bandwidth to be used for setting the VBW when VBW is in Auto.

Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio <real>`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio?`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:RATio:AUTO?`

Example	MON:BAND:VID:RAT 2 MON:BAND:VID:RAT? :MON:BAND:VID:RAT:AUTO 0 :MON:BAND:VID:RAT:AUTO?
Preset	1 ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
Key Path	**BW**

Span:3dB RBW

Selects the ratio between span and resolution bandwidth.

The default setting is Auto with a Span:3 dB RBW ratio of 106:1. You can manually change this ratio by pressing the key, entering a new value, and pressing Enter.

Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio <integer>`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio?`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO?`

Example	MON:FREQ:SPAN:BAND:RAT 200 MON:FREQ:SPAN:BAND:RAT? :MON:FREQ:SPAN:BAND:RAT:AUTO ON :MON:FREQ:SPAN:BAND:RAT:AUTO?
Preset	106 ON
State Saved	Saved in instrument state.
Min	2
Max	10000
Key Path	**BW**

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**

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.

After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:AVERage:COUNt <integer>`
	`[:SENSe]:MONitor:AVERage:COUNt?`
	`[:SENSe]:MONitor:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:MONitor:AVERage[:STATe]?`
Example	:MON:AVER:COUN 25
	:MON:AVER:COUN?
	:MON:AVER ON
	:MON:AVER?
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	1000
Key Path	**Meas Setup**

Avg Mode

Toggles the average mode between exponential (Exp) and Repeat.

Exp- continues measurement averaging, using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

Repeat- causes the measurement to reset the average counter each time the specified number of averages is reached.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:MONitor:AVERage:TCONtrol?`
Example	:MON:AVER:TCON EXP
	:MON:AVER:TCON?
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exponential|Repeat
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	All except SA and BASIC
Remote Command	`:CONFigure:MONitor`
Example	:CONF:MON
Key Path	**Meas Setup**

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement.

See Trigger in the "Measurement Functions" section for more information.

Mode	All except SA and BASIC
Remote Command	`:TRIGger:MONitor[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF`
	`:TRIGger:MONitor[:SEQuence]:SOURce?`
Example	:TRIG:MON:SOUR IMM
	:TRIG:MON:SOUR?
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run|Video|Line|External 1| External 2|RF Burst|Periodic Timer
Key Path	**Trigger**

Auto Trig

See Auto Trig in the “Measurement Functions " section for more information.

Trig Hold Off

See Trig Hold Off in the “Measurement Functions " section for more information.

Sweep/Control

Access a menu of functions that enable you to set up and control the sweep time for the current measurement

Key Path	**Front-panel key**

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time is required by the analyzer. It impacts the sweep rate, but is not calculated as part of the sweep time. Reducing the sweep time increases the rate of sweeps.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:SWEep:TIME <time>`
	`[:SENSe]:MONitor:SWEep:TIME?`
	`[:SENSe]:MONitor:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:SWEep:TIME:AUTO?`
Example	:MON:SWE:TIME 100 ms
	:MON:SWE:TIME?
	:MON:SWE:TIME:AUTO ON
	:MON:SWE:TIME:AUTO?
Preset	Automatically Calculated
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
MIN/MAX/DEF Support	Yes
Key Path	**Sweep/Control**

Pause

Pauses a measurement after the current data acquisition is complete.
When Paused, the label on the key changes to Resume. Pressing Resume continues the measurement at

the point where it had been paused.

See Pause/Resume under Sweep/Control in the "Analyzer Setup Functions" section for more information.

Key Path	**Sweep/Control**

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.

Key Path	**Sweep/Control**

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.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:SWEep:POINts <integer>`
	`[:SENSe]:MONitor:SWEep:POINts?`
Example	:MON:SWE:POIN 1000
	:MON:SWE:POIN?
Dependencies/Couplings	Whenever the number of sweep points changes, the sweep time is re–quantized.
Preset	1001
State Saved	Saved in instrument state.
Range	1 to 20001
Key Path	**Sweep/Control**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

See the "Marker Functions" section for more information

Key Path	**Front-panel key**

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

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.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:MON:MARK:MODE POS
	:CALC:MON:MARK:MODE?

Restriction and 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
Key Path	**Marker**

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	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:MON:MARK3:X 0 :CALC:MON:MARK3:X?
Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
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

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	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:MON:MARK:X:POS 0
	CALC:MON:MARK:X:POS?
Restriction and Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is **Off** the response is not a number.
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

Marker Y Axis Value (Remote Command only)

Returns the marker Y Axis value in the current marker**.**

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:MON:MARK11:Y?
Preset	Result dependant on markers setup and signal source

Properties

Accesses a menu that enables you to select the active marker, the reference marker and the trace for the current measurement.

Key Path	**Marker**

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

Relative To

Selects the desired marker. The selected marker is relative to its reference marker

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:MON:MARK:REF 1
	CALC:MON:MARK:REF?
Restriction and 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.”
Remote Command Notes	When queried a single value is returned (the specified marker number’s 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe <integer>`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:MON:MARK:TRAC 1
	:CALC:MON:MARK:TRAC?
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3
Key Path	**Marker, Properties**

Couple Markers

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).

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:MONitor:MARKer:COUPle[:STATe]?`
Example	:CALC:MON:MARK:COUP ON
	:CALC:MON:MARK:COUP?
Preset	OFF

State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Marker**

All Markers Off

Turns off all markers on the current measurement.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer:AOFF`
Example	CALC:MON:MARK:AOFF
Key Path	**Marker**

Peak Search

There is no ‘Peak Search’ functionality supported in Monitor Spectrum. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**

Marker To

There is no ‘Marker To’ functionality supported in Monitor Spectrum. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

Accesses special marker functions such as marker noise, and power in a specified bandwidth or time interval.

Key Path	**Front-panel key**

Select Marker

Selects one of the 12 available markers.

Key Path	**Marker Function**

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off.

Mode	BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion NOISe|BPOWer|BDENsity|OFF` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`
Example	`:CALC:MON:MARK:FUNC NOIS` `:CALC:MON:MARK:FUNC?`
Preset	OFF
State Saved	Saved in instrument state.
Range	Marker Noise|Band/Interval Power|Band Interval Density|Marker Function Off
Key Path	**Marker Function**

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**

Band/Interval Span for Frequency Domain

Sets the width of the frequency span for the selected marker.

Mode	BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <freq>`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	`:CALC:MON:MARK12:FUNC:BAND:SPAN 20 MHz`
	:CALC:MON:MARK12:FUNC:BAND:SPAN?
Dependencies/Couplings	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values.
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Key Path	**Marker Function**

Band/Interval Left for Frequency Domain

Sets the left edge frequency or time value for the band of the selected marker.

Mode	BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <freq>`
	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?`

Example	`:CALC:MON:MARK12:FUNC:BAND:LEFT 20 GHz` :CALC:MON:MARK12:FUNC:BAND:LEFT?
Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values.
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Key Path	**Marker Function**

Band/Interval Right for Frequency Domain

Sets the right edge frequency or time value for the band of the selected marker.

Mode	BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	`:CALC:MON:MARK12:FUNC:BAND:RIGH 20 GHz` :CALC:MON:MARK12:FUNC:BAND:RIGH?
Dependencies/Couplings	Changing the Band/Interval Right necessarily changes the Band/Interval Left and Band/Interval Span values
Preset	Depends on X axis range of selected Trace.
State Saved	Saved in instrument state.
Min	–9.9E+37
Max	9.9E+37
Key Path	**Marker Function**

16 Waveform

The waveform measurement is a generic measurement for viewing the input signal waveforms in the time domain. This measurement is how the instrument performs the zero span functionality found in traditional spectrum analyzers. Also available under basic waveform measurements is an I/Q window, which shows the I and Q signal waveforms in parameters of voltage versus time to disclose the voltages which comprise the complex modulated waveform of a digital signal.

The waveform measurement can be used to perform general purpose power measurements to a high degree of accuracy as well.

Key Path **Front-panel key**

The general functionality of CONFigure, INITiate, FETCh, MEASure, and READ are described at this section. See the SENSe subsystem commands for more measurement related commands.

The following table denotes the returned results from the FETCh|MEASure|READ commands:

`:CONFigure:WAVeform`

`:CONFigure:WAVeform:NDEFault`

`:INITiate:WAVeform`

`:FETCh:WAVeform[n]`

`:MEASure:WAVeform[n]`

`:READ:WAVeform[n]`

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

1	Returns the following scalar results: Sample Time is a floating point number representing the time between samples when using the trace queries (n=0, 2, and so forth). Mean Power is the mean power (in dBm). This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. Mean Power Averaged is the power (in dBm) for N averages, if averaging is on. This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Peak-to-mean ratio has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peak-to-mean ratio is calculated using the highest peak value, rather than the displayed average peak value. Maximum value is the maximum of the most recently acquired data (in dBm). Minimum value is the minimum of the most recently acquired data (in dBm).
2	Returns trace point values of the entire captured signal envelope trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

Measurement Results

The following information describes the Waveform measurement results.

Graphic Results View

The RF Envelope view shows an example of the RF Envelope result for the waveform (time domain) measurements in the graph window. The measured values for the mean power and peak-to-mean power are shown in the text window.

The I/Q Waveform view shows the I and Q signal waveforms in parameters of voltage versus time.

Numeric Results

Name	Type	Description	Unit	Format
Mean Pwr	Float64	The mean power (dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled.	dBm	XX.XX dBm
Pk-to-Mean	Float64	This is the ratio of the maximum signal level to the mean power.	dB	XX.XX dB
Max Pt	Float64	The maximum of the most recently acquired data.	dBm	XX.XX dBm
Min Pt	Float64	The minimum of the most recently acquired data.	dBm	XX.XX dBm

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

Key Path	**Front-panel key**

Ref Value

Sets the reference value for time on the horizontal axis. When Auto Scaling is set to On, the displayed plots use a Scale/Div value determined by the analyzer, based on the measurement result.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RLEV 10 ms
	DISP:WAV:VIEW:WIND:TRAC:X:RLEV?
Restriction and 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.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00 s
State Saved	Saved in instrument state.
Min	–1.000 s
Max	10.00 s
Key Path	**SPAN X Scale**

Scale/Div

Sets the horizontal scale by changing a time value per division.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:PDIV 500 us
	DISP:WAV:VIEW:WIND:TRAC:X:PDIV?
Restriction and 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.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	200.0 us
State Saved	Saved in instrument state.
Min	1.000 ns
Max	1.000 s
Key Path	**SPAN X Scale**

Ref Position

Sets the reference position for the X axis to either Left, Center or Right.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt`
	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RPOS LEFT
	DISP:WAV:VIEW:WIND:TRAC:X:RPOS?

Restriction and Notes	Allows you to set the reference position to either Left, Ctr (center) or Right.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Key Path	**SPAN X Scale**

Auto Scaling

Toggles the scale coupling function between On and Off.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:COUP ON DISP:WAV:VIEW:WIND:TRAC:X:COUP?
Dependencies/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.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**SPAN X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters.

Key Path	**Front-panel key**

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.

Ref Value (RF Envelope View)

Sets the Y Scale reference value (in dBm) when the RF Envelope View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <ampl>`
	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RLEV –50 dBm
	DISP:WAV:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/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.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Range	–250.00 dBm to 250.00 dBm
Key Path	**AMPTD Y Scale**

Ref Value (I/Q Waveform View)

Sets the Y Scale reference value (in volts) when the I/Q Waveform View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <voltage>`
	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV 25 V
	DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV?
Dependencies/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.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	0 V
State Saved	Saved in instrument state.
Min	–250 V
Max	250 V
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has a readback text that describes total attenuator value

See AMPTD Y Scale, Attenuation in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

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.

Scale/Div (RF Envelope View)

Sets the scale per division for the RF Envelope result waveform (time domain) measurements in the graph window.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>`
	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:PDIV 5 dB
	DISP:WAV:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/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.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00 dB
State Saved	Saved in instrument state.
Range	0.10 dB to 20.00 dB
Key Path	**AMPTD Y Scale**

Scale/Div (I/Q Waveform View)

Sets the scale per division for the I/ Q signal waveform graph.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO

Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <voltage>`
	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV 25 mV
	DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV?
Dependencies/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.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	100.0 mV
State Saved	Saved in instrument state.
Min	1.0 nV
Max	20 V
Key Path	**AMPTD Y Scale**

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, Internal Preamp in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

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.

Ref Position (RF Envelope View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference

position does not change the reference level value.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RPOS CENT
	DISP:WAV:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Key Path	**AMPTD Y Scale**

Ref Position (I/Q Waveform View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS CENT
	DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Key Path	**AMPTD Y Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the **Restart** front panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON`
	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:COUP OFF
	DISP:WAV:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically switches the scale per division and reference values into the defaults.
	When the user sets a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement

Key Path	**Front-panel key**

Display

Accesses a menu of functions that enable you to set the display parameters. See Display in the "Analyzer Setup Functions" section for more information.

Key Path	**View/Display**

Change Title

Accesses an Alpha Editor menu that enables you to write a title across the top of the display. This menu contains characters and symbols that may also be used with the numeric keypad. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title remains until you press Change Title again, or you recall a trace or state, or a Factory Preset is performed. A title can also be cleared by pressing Title, Clear Title.

This table is for SCPI definition purpose only and SCPI command and Preset/Default value are defined on measurement basis.

Mode	**BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO**
Remote Command	`:DISPlay:WAVeform:ANNotation:TITLe:DATA <string>`
	`:DISPlay:WAVeform:ANNotation:TITLe:DATA?`
Example	DISP:WAV:ANN:TITL:DATA “Agilent”
	DISP:WAV:ANN:TITL:DATA?
Preset	IQ Waveform

State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

View

Selects the results view.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW[:SELect] RFENvelope|IQ`
	`:DISPlay:WAVeform:VIEW[:SELect]?`
Example	DISP:WAV:VIEW RFEN
	DISP:WAV:VIEW?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope|IQ Waveform
Key Path	**View/Display**

View Selection by number (SCPI only)

Displays the numeric values of the measurement results.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:DISPlay:WAVeform:VIEW:NSELect <integer>`
	`:DISPlay:WAVeform:VIEW:NSELect?`
Example	DISP:WAV:VIEW:NSEL 1
	DISP:WAV:VIEW:NSEL?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.

Preset	1
State Saved	Saved in instrument state.
Min	1
Max	2

Trace/Detector

There is no ‘Trace/Detector’ functionality supported in the Waveform measurement. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**

BW

Accesses a menu that enables you to control the information bandwidth functions of the instrument. You can also select the filter type for the measurement.

Key Path	**Front-panel key**

Info BW

Enables you to set the information bandwidth (Info BW) of the analyzer.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:BANDwidth[:RESolution] <freq>`
	`[:SENSe]:WAVeform:BANDwidth[:RESolution]?`
Example	WAV:BAND 1 KHZ
	WAV:BAND?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	All except GSM/EDGE: 100 kHz
	GSM/EDGE: 510kHz
	TDSCDMA: 1.3MHZ
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Key Path	**BW**

IBW Control

Accesses the Filter Type key

Key Path	**BW**

Filter Type

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

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:BANDwidth:SHAPe GAUSsian|FLATtop`
	`[:SENSe]:WAVeform:BANDwidth:SHAPe?`
Example	WAV:BAND:SHAP GAUS
	WAV:BAND:SHAP?
Dependencies/Couplings	See the description above
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|FlatTop
Key Path	**BW, RBW Control**

Meas Setup

Displays the setup menu keys that enable you to control the parameters for the current measurement.

Key Path	**Front-panel key**

Average/Hold Number

Sets the number of sweeps (average counts) that are averaged. After the specified number of sweeps, the averaging mode (terminal control) setting determines the averaging action.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:AVERage:COUNt <integer>`
	`[:SENSe]:WAVeform:AVERage:COUNt?`
	`[:SENSe]:WAVeform:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:WAVeform:AVERage[:STATe]?`
Example	WAV:AVER:COUN 1001
	WAV:AVER:COUN?
	WAV:AVER ON
	WAV:AVER?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
	You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	20001
Key Path	**Meas Setup**

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.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:AVERage:TCONtrol EXPonential|REPeat`
	`[:SENSe]:WAVeform:AVERage:TCONtrol?`
Example	WAV:AVER:TCON REP
	WAV:AVER:TCON?
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Avg Type

Selects the type of averaging.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar`
	`[:SENSe]:WAVeform:AVERage:TYPE?`
Example	WAV:AVER:TYPE MAX
	WAV:AVER:TYPE?
Restriction and Notes	The SCPI selection of MAX and MIN are kept because of BWCC reason, but they are removed from the front panel access because they are not Average.

Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS)|Log-Pwr Avg(Video)|Voltage Avg
Key Path	**Meas Setup**

Meas Time

Sets how long the measurement is performed. X Scale only changes the representation of the display.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:SWEep:TIME <time>`
	`[:SENSe]:WAVeform:SWEep:TIME?`
Example	WAV:SWE:TIME 50 ms
	WAV:SWE:TIME?
Restriction and Notes	Specifies and returns how long the measurement is performed. It is the time record length of the measurement waveform. The Max time may be reduced when the sample frequency is high due to the memory limitation.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	2.000000 ms
State Saved	Saved in instrument state.
Range	1.000 (s to 100.00 s
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO

Remote Command	`:CONFigure:WAVeform`
Example	CONF:WAV
Restriction and Notes	Restore default values of all parameters.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup**

Advanced

Accesses a menu of "advanced" functions that are used for specific applications. These settings should not be changed for most measurements.

Key Path	**Meas Setup**

ADC Dither

Accesses the ADC Dither control menu.

Key Path	**Meas Setup, Advanced**

ADC Dither Auto Sets ADC dithering to automatically select whether dithering is needed.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:ADC:DITHer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:WAVeform:ADC:DITHer:AUTO[:STATe]?`
Example	WAV:ADC:DITH:AUTO ON
	WAV:ADC:DITH:AUTO?
Restriction and Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor. Behavior of this function is the same as the Spectrum Analyzer. Refer to the SA PD for detail. This table is for SCPI definition purpose only.

Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Meas Setup, Advanced, ADC Dither**

ADC Dither Toggles the dither function On and Off. The dither function improves linearity for low level signals, at the expense of a higher noise floor.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:ADC:DITHer[:STATe] OFF|ON|0|1` `[:SENSe]:WAVeform:ADC:DITHer[:STATe]?`
Example	WAV:ADC:DITH ON WAV:ADC:DITH?
Restriction and Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor..
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Key Path	**Meas Setup, Advanced, ADC Dither**

IF Gain

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, Advanced**

IF Gain Auto Activates the auto rules for IF Gain. When Auto is active, the IF Gain is set to High Gain under and of the following conditions:

- The input attenuator is set to 0 dB
- the preamp is turned On and the frequency range is under 3.6 GHz

For other settings, Auto sets the IF Gain to Low Gain.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:WAVeform:IF:GAIN:AUTO[:STATe]?`
Example	WAV:IF:GAIN:AUTO ON
	WAV:IF:GAIN:AUTO?
Restriction and Notes	This table is for SCPI definition purpose only.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Meas Setup, Advanced, IF Gain**

IF Gain State Selects the range of IF gain.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`[:SENSe]:WAVeform:IF:GAIN[:STATe] AUTOrange|LOW|HIGH`
	`[:SENSe]:WAVeform:IF:GAIN[:STATe]?`
Example	WAV:IF:GAIN HIGH
	WAV:IF:GAIN?
Restriction and Notes	This table is for SCPI definition purpose only.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	AUTO
State Saved	Saved in instrument state.

Range	Autorange (Slower Follows Signals)|Low (Best for Large Signals)|High (Best Noise Level)
Key Path	**Meas Setup, Advanced, IF Gain**

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement

.See Trigger in the "Measurement Functions" section for more information.

Key Path	**Front-panel key**

Trigger

Selects a trigger source. Trigger settings are mode global. Refer to Mode functionality section for trigger settings. Refer to “Trigger” in the “Measurement Functions” section.

Mode	WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`TRIGger:WAVeform[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeoTRIGger:WAVeform:SOURce?`
Example	TRIG:WAV:SOUR LINE TRIG:WAV:SOUR?
Remote Command Notes	You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	All except GSM/EDGE: IMMediate GSM/EDGE: RFBurst
State Saved	Saved in instrument state.
Range	Free Run|Video|Line|External 1|External 2|RF Burst (Wideband)|Periodic Timer
Key Path	**Trigger**

Sweep/Control

Accesses the Sweep menu that allows you to pause and restart the measurement.

Key Path **Front-panel key**

Pause and Resume

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 Sweep/Control in the "Analyzer Setup Functions" section for more information.

Key Path **Sweep/Control**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

See the "Marker Functions" section for more information

Key Path	**Front-panel key**

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

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.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:WAV:MARK:MODE OFF
	CALC:WAV:MARK:MODE?

Restriction and 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.
Remote Command Notes	NORMal is changed to POSition in the new SA. You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Key Path	**Marker**

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:WAV:MARK:X 50 ms CALC:WAV:MARK:X?

Restriction and Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. If the specified marker is Fixed and a Marker Function is on, error –221 "Settings conflict; cannot adjust Fixed marker while Marker Function is on" is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
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

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO

Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>`
	
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`

Example	CALC:WAV:MARK:X:POS 500 CALC:WAV:MARK:X:POS?
Restriction and 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.

Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
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

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:WAV:MARK11:Y?
Restriction and Notes	When the marker is on IQ waveform, returns I and Q values. Case #1 - Trace RF: returns a single double value. >:CALC:WAV:MARK1:Y? –2.402406506109E+001 Case #2 - Trace IQ: returns an double array of two values, the first is X, and the second is Y. >:CALC:WAV:MARK1:Y? –3.006944493834E–003,+9.9870666467354E–004
Remote Command Notes	You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	Result dependant on markers setup and signal source
State Saved	No

Properties

Accesses the marker properties menu.

Key Path	**Marker**

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>`
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:WAV:MARK:REF 8
	CALC:WAV:MARK:REF?
Restriction and 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.”
Remote Command Notes	When queried a single value is 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 mode that Waveform measurement is included 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
Key Path	**Marker, Properties**

Marker Trace

Assigns the specified marker to the designated trace.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|IQ` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:WAV:MARK:TRAC RFEN CALC:WAV:MARK:TRAC?
Restriction and Notes	Assigns the specified marker to the designated trace.
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEN
State Saved	Saved in instrument state.
Range	RF Envelope|IQ Waveform
Key Path	**Marker**

Couple Marker

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X axis movement of every other marker which is not **Off**. “Equal X axis movement” refers to the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units) are preserved.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO

Remote Command	`:CALCulate:WAVeform:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:WAVeform:MARKer:COUPle[:STATe]?`
Example	CALC:WAV:MARK:COUP ON
	CALC:WAV:MARK:COUP ON
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Marker**

All Markers Off

Turns off all markers.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer:AOFF`
Example	CALC:WAV:MARK:AOFF
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace and accesses a menu that enables you to select to do a minimum peak search.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:WAV:MARK2:MAX`
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Front panel key**

Min Search

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

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:WAV:MARK:MIN
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Peak Search**

Marker To

There is no ‘Marker To’ functionality supported in Waveform measurements. The front-panel key displays a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

Accesses a menu of marker functions that perform post-processing operations on markers based on the measurement specifications. Marker functions are distinct from Measurement functions, which automatically perform complex sequences of setup, data acquisition, and display operations in order to measure specified signal characteristics. Marker Functions are specified for each individual marker and may be turned on individually for each marker.

The Marker Function menu controls which marker functions are turned on and allows you to adjust the setup parameters for each function. These parameters include the following, but only one parameter can be assigned to a given marker:

- **Marker Noise**
- **Band/Interval Power**
- **Band/Interval Density**
- **Marker Function Off**

Key Path	**Front-panel key**

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker**

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion BPOWer|BDENsity|OFF`
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`

Example	`CALC:WAV:MARK:FUNC BPOW` CALC:WAV:MARK:FUNC?
Remote Command Notes	You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Band/Interval Power|Band Interval Density|Marker Function Off
Key Path	**Marker Function**

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**

Band/Interval Span for Time Domain

Sets the width of the frequency span for the selected marker.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	CALC:WAV:MARK:FUNC:BAND:SPAN 20 ms CALC:WAV:MARK:FUNC:BAND:SPAN?
Dependencies/Couplings	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	10% of Meas Time
State Saved	Saved in instrument state.

Min	0
Max	100s
Key Path	**Marker Function**

Band/Interval Left for Time Domain

Sets the left edge frequency or time value for the band of the selected marker.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?`
Example	CALC:WAV:MARK12:FUNC:BAND:LEFT 1 s CALC:WAV:MARK12:FUNC:BAND:LEFT?
Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100s
Key Path	**Marker Function**

Band/Interval Right for Time Domain

Sets the right edge frequency or time value for the band of the selected marker.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO

Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	CALC:WAV:MARK12:FUNC:BAND:RIGH 1 s CALC:WAV:MARK12:FUNC:BAND:RIGH?
Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Remote Command Notes	You must be in the mode that includes Waveform measurements to use this command. Use INSTrument:SELect to set the mode.
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100s
Key Path	**Marker Function**