User’s and Programmer’s Reference

N9075A 802.16 OFDMA Measurement Application

For use with N9020A MXA Signal Analyzer

Agilent Technologies

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1 What Does the 802.16 OFDMA Measurement Application Do?

This chapter provides overall information for the 802.16 OFDMA Mobile measurement application, which supports two similar wireless technologies: WiMAX and WiBro. To illustrate OFDMA measurements, this chapter describes only WiMAX-OFDMA examples for BTS and MS.

The IEEE 802.16 OFDMA wireless standard supports fixed and mobile wireless access (BWA) systems for metropolitan and area networks. The IEEE 802.16 standard is an OFDMA based system that supports a range of bandwidths (e.g. 1.25 MHz, 10 MHz, and 20 MHz) with fixed subcarrier spacing through use of a scalable architecture. The scalable architecture uses a scalable subchannelization structure with variable Fast Fourier Transform (FTT) sizes, where the FFT sizes scale with bandwidth to keep subcarrier spacing fixed.)

WiBro is a wireless broadband internet technology. WiBro base stations will offer an aggregate data throughput of 30 to 50 Mbits/s and cover a radius of 1 - 5 km, enabling portable internet usage within range of the base station. WiBro also offers Quality of Service (QoS). QoS enables WiBro to stream video content and other loss-sensitive data in a reliable manner.

The 802.16 OFDMA Measurement Application supports the following standards:

- - IEEE 802.16e -2005
- - WiBro (Korean mobile WiMAX OFDMA service)

The following measurements may be preformed using the 802.16 ODFDMA Measurement Application:

- Channel Power
- ACP
- Spectrum Emission Mask
- Spurious Emissions
- Occupied Bandwidth
- Power Stat CCDF
- Modulation Analysis
- Power vs. Time
- Monitor Spectrum
- 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 MXA 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

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

The front-panel key functions in this section are accessible when you are using any of the measurements available in this application.

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.

Key Path	**System**

Errors

There are two modes for the Errors selection, **History** and **Status**.

Errors 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 (unlabeled

Displays the icon identifying the event or condition as an error or warning.

ID

Displays the error number.

Message

Displays the message text.

Repeat (RPT)

This field shows the number of consecutive instances of the event, uninterrupted by other events. 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
Key Path	**System, Show**

Saved State	No
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.

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 I 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.

NOTE **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
Preset	OFF
State Saved	No
Range	On | Off
Key Path	**System, Show**

Show Hardware

The Hardware screen is used to view details of the installed hardware. The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

```
<Product Name> <Product Description>
Product Number: N9020A
Serial Number: US44240924
Firmware Revision: A.01.01
Computer name: <hame>
Host ID: N9020A,US44220924

Assembly Name  | Part #        | Serial #      | Matl Rev | Bd Rev | OF Rev | Hw Id | Misc
Analog IF        E441060104  7804400066    003          0        A          15    1.0.0.0
```

The Previous Page key 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
Preset	OFF
State Saved	No
Range	On | Off
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 Preset, 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 Preset

Sets **Power On** to **Mode Preset**. When the analyzer is powered on in Mode Preset, it will perform a Mode Preset to all modes in the instrument and it will wake up in the power-on mode. It will not affect any settings beyond what a normal Mode Preset affects.

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.

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 enables the user to 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 Preset and Restore System Defaults All. The factory will load a default power-on mode using what modes are installed in the instrument and the precedence table documented in the Power-On Mode section.

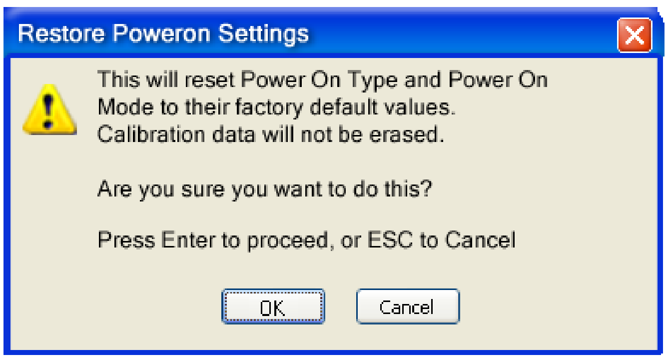
NOTE When measurement applications are loaded, this Mode Menu contains a menu key for each loaded application. Under the Service subsystem, there is a way to change the factory default Power On Mode.

Mode	All
Remote Command	`:SYSTem:PON:MODE SA|WCDMA| WiMAX OFDMA|BASIC`
	`: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. Highest measurement throughput is obtained with Auto Align Off, however the user assumes responsibility for warranted measurements by periodically performing an Align Now, All. The instrument will inform the user that an alignment is needed based on the Alert setting.

When Auto Align is executing, Bit 0 in the Status Operational register is set.

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**

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 a full alignment and clear the “Align Now, All required” condition before beginning the auto alignment processing.

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.

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**

Partial

Auto Align, **Partial** disables thorough automatic alignment and the maintenance of warranted operation for the benefit of improved measurement throughput, with accuracy retained for the Resolution Bandwidths. With Auto Align set to Partial, the operator is responsible for maintaining warranted operation by performing Align Now, All on a periodic basis. The Auto Align, Alert mechanism will notify the operator when an Align Now, All should be performed.

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 (warning icon is intended to inform the operator they are responsible for the 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, the operator is responsible for maintaining warranted operation by performing Align Now, All on a periodic basis. The Auto Align, Alert mechanism will notify the operator when and Align Now, All should be performed.

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

When Auto Align, Off is selected the Settings Panel indicates ALIGN OFF with a warning icon (warning icon is intended to inform the operator they are responsible for the 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 changes in the input impedance between measurements, which could cause input device instability.) When Auto Align, All but RF ON is selected, the operator is responsible for performing an Align Now, RF with every 3 degrees Celsius temperature change, or a time span of 24 hours since the last Align Now, RF. The Auto Align, Alert mechanism will notify the operator to perform an Align Now, All when the time expires or 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 the user will need to perform a full alignment (for example, Align Now, All). The alert is the Error Condition “Align Now, All required” and bit 14 is set in the Status Questionable Calibration register.

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 as 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**

Time & Temperature

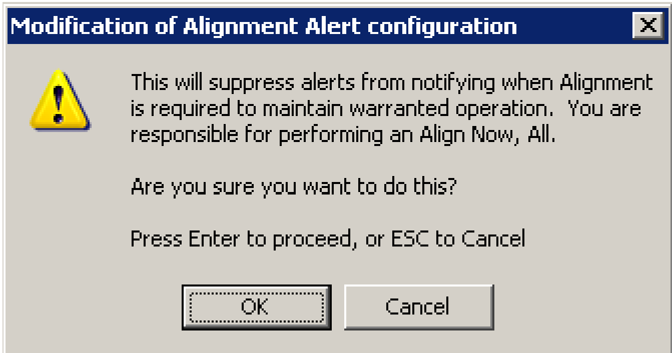
With Auto Align Alert set to Time & Temperature the instrument will signal an alert after 3 degrees Celsius temperature change or a time span of 24 hours since the last successful full alignment (for example, Align Now, All or completion of a thorough Auto Align). The alert is the Error Condition "Align Now, All required" and bit 14 is set in the Status Questionable Calibration register

Mode	All
Example	:CAL:AUTO:ALER TTEM
Key Path	**System, Alignments, Auto Align, Alert**

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 thorough Auto Align). An operator may choose this selection in an environment where the temperature is stable on a daily basis. The alert is the Error Condition "Align Now, All required" and bit 14 is set in the Status Questionable Calibration register.

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



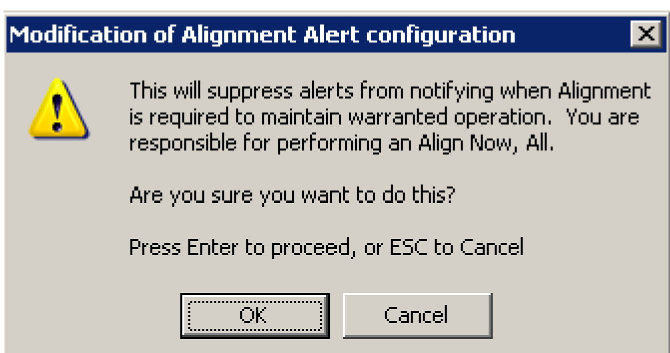
No confirmation is required when Alert is configured through a remote command.

Mode	All
Example	:CAL:AUTO:ALER DAY
Key Path	**System, Alignments, Auto Align, Alert**

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 thorough Auto Align). An operator may choose this selection in an environment where the temperature is stable on a weekly basis. The alert is the Error Condition “Align Now, All required” and bit 14 is set in the Status Questionable Calibration register.

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



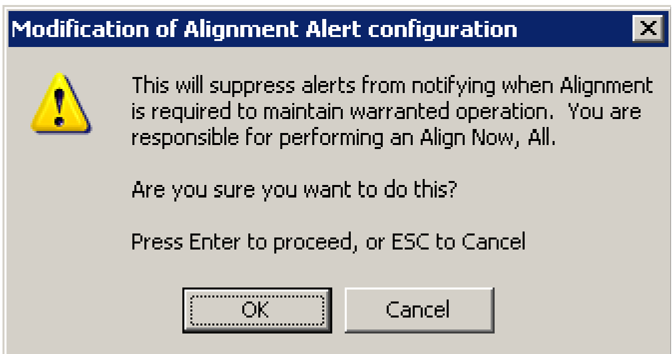
No confirmation is required when Alert is configured through a remote command.

Mode	All
Example	:CAL:AUTO:ALER WEEK
Key Path	**System, Alignments, Auto Align, Alert**

None

With Auto Align Alert set to None the instrument will not signal an alert. This is provided for rare occasions where the operator is 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.

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 that perform complete operations that run until 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.

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**

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 signal.

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 employed for an individual subsystem, but not a cohesive 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**

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).

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. No new alignment data is employed.

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**

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 508, 513, or 526)

The Preselector tuning curve drifts over temperature and time. 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. Character Preselector is used 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 amplitude accuracy.

Characterize Preselector immediately executes a characterization of the Preselector. 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. No new characterization data is employed.

Mode	All
Remote Command	`:CALibration:YTF` `:CALibration:YTF?`
Example	:CAL:YTF
Restriction and Notes	For Option 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

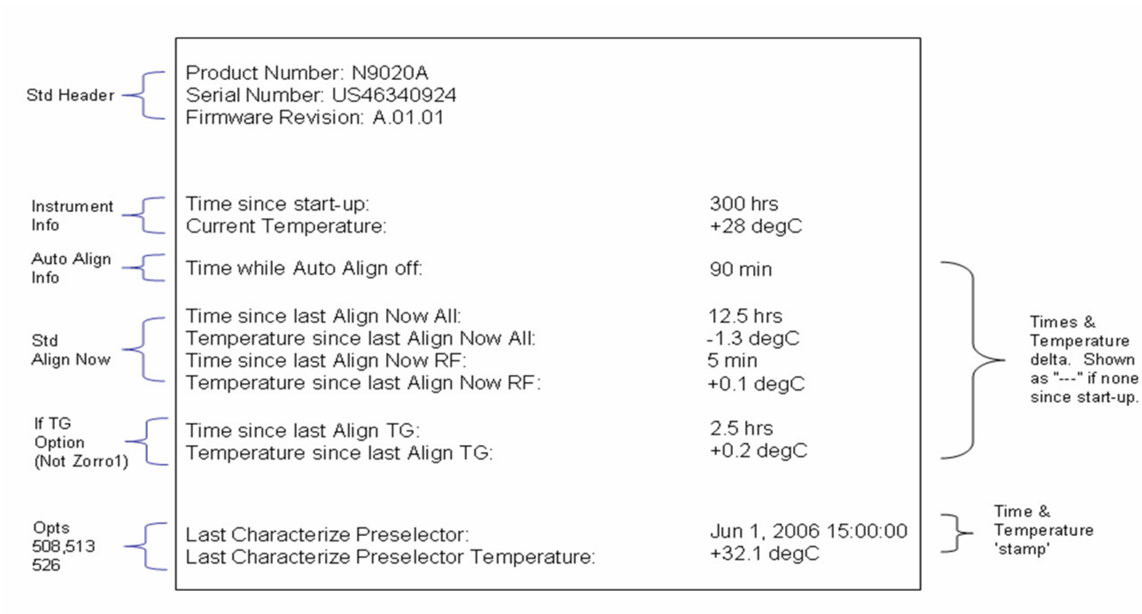
Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

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.

The screen for Show Alignment Statistics is a Text Screen similar to Show System or Show Errors. Previous Page and Next Page menu key selections are available in conformance with the Text Screen standard.

The screen contents can be printed. The Show Alignment Statistics screen will be exited in conformance with the Text Screen standard.

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
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, Alignments**
Saved State	No
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.
Key Path	**Visual annotation in the Show Alignment Statistics screen**
Saved State	No
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)
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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. Returns NaN if no Align Now, All or Align Now, All but RF executed since power-up.
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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. Returns NaN if no Align Now, All or Align Now, All but RF executed since power-up.
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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. Returns NaN if no Align Now, RF executed since power-up.
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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. Returns NaN if no Align Now, RF executed since power-up.
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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.
Key Path	**Visual annotation in the Show Alignment Statistics screen**

Saved State	No
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. Returns NaN if no Characterize Preselector has ever been performed on the instrument.

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Saved State	No
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.
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**

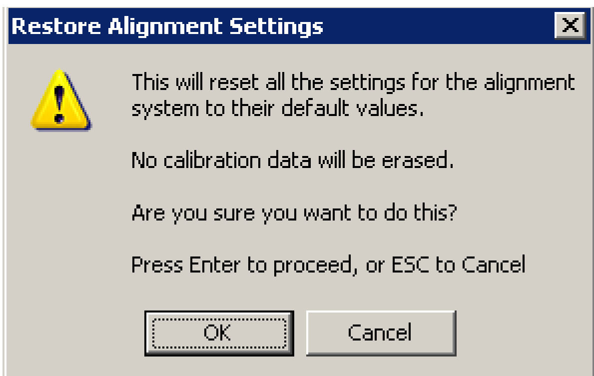
Remote Command	`:CALibration:FREQuency:REFerence:COARse <integer>` `:CALibration:FREQuency:REFerence:COARse?`
Example	:CAL:FREQ:REF:COAR 8191

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, the operator is prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

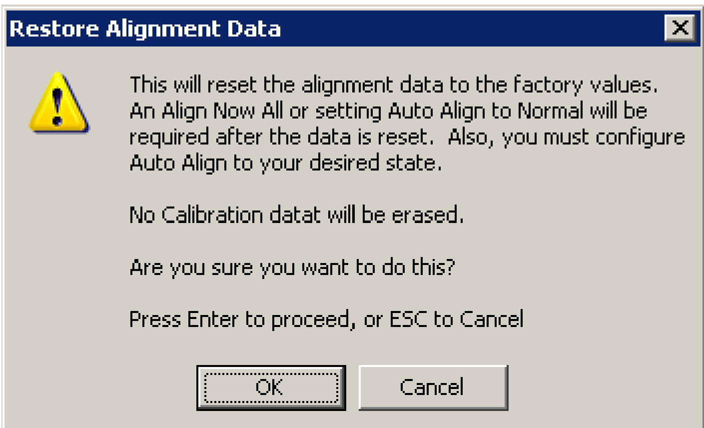
Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off
Auto Align Alert	Time & Temperature

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 required before 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 (Remote Only)

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.)

PSA Manual Table 4–1 SCPI Default Settings

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

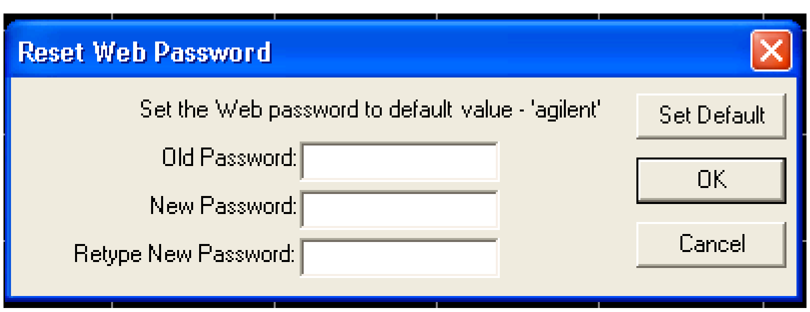
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your 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 web server 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) key.

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

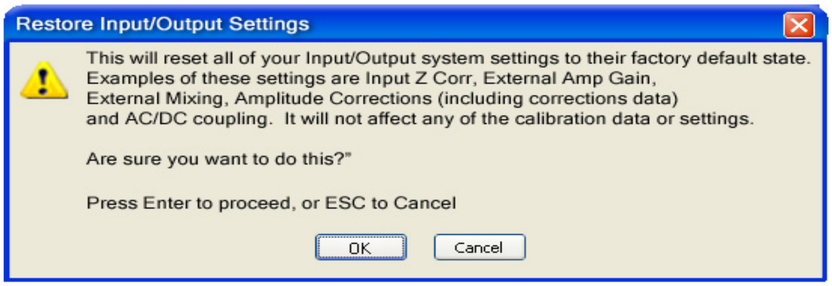
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back 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:

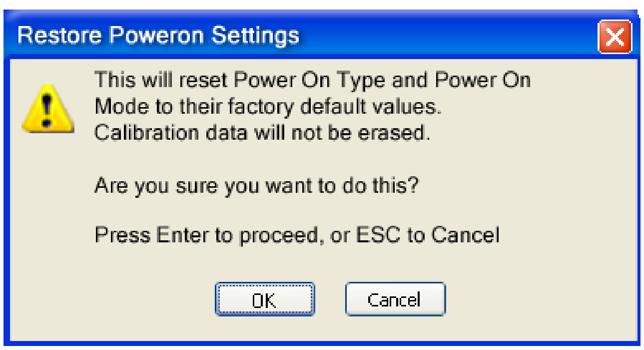


Example	:SYST:DEF INP
Key Path	**System, Restore System Defaults**

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 Preset 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:



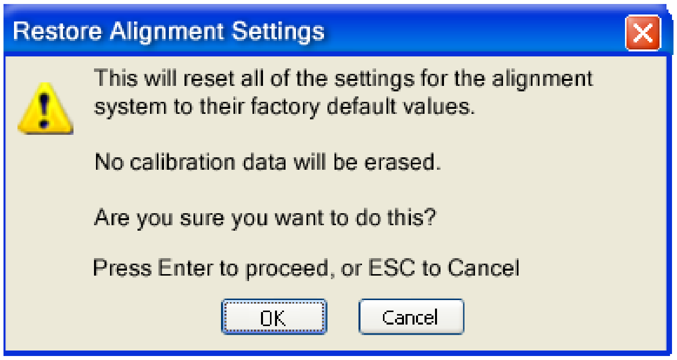
Example	:SYST:DEF PON
Key Path	**System, Restore System Defaults**

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**

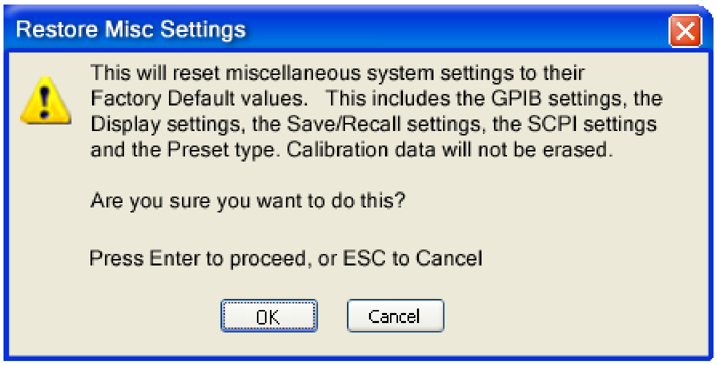
Misc

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

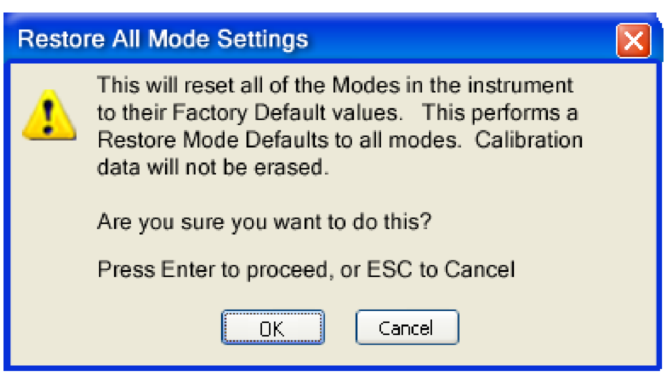
Confirmation is required to restore the factory default values. The confirmation dialog is:



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:

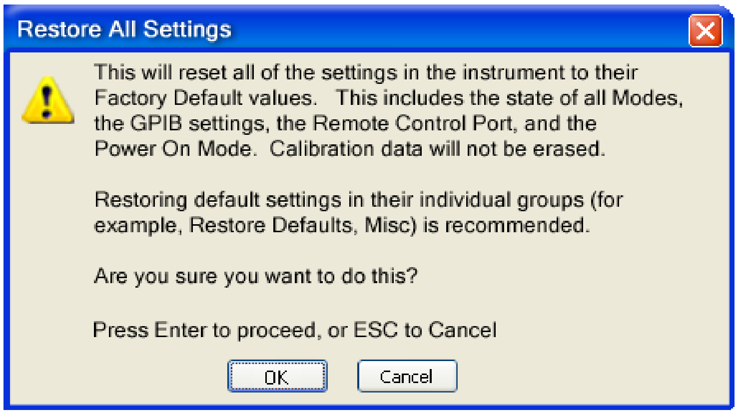


Example	:SYST:DEF MOD
Dependencies/Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode. It gets the mode to a consistent state with all of the default couplings set.
Key Path	**System, 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 remote command for this key.
Key Path	**System**

List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (N9020A). .

Saved State	No
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,FPR" :SYSTem:OPTions? and *OPT? are synonymous.

Lock the Front Panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. An annunciator reading "K" for 'Klock" 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 Timezone 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

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

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**
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.

The Save As dialog is loaded with the file information related to the State Save Type. The filename is filled in using the auto file naming algorithm for the State Save Type and is highlighted. Also, 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**
Restriction and Notes	Brings up Save As dialog for saving a State Save Type
Key Path	**Save, State**

Save As...

Accesses a menu that enables you to select the location where you can save the State. 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 State Save Type. The filename is filled in using the auto file naming algorithm for the State Save Type and is highlighted.

The Save As dialog is loaded with the file information related to the State Save Type. The filename is filled in using the auto file naming algorithm for the State Save Type and is highlighted.

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 (e.g., 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.

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**
Restriction and Notes	Brings up Save As dialog for saving a State Save Type
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 icon. After the save completes, the Advisory Event “File <register

number> saved" is displayed.

Mode	**All**
Remote Command	`:MMEMory:STORe:STATe <filename>`
Example	:MMEM:STOR:STAT "myState.state" saves the file myState.state on 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. Auto return to the State menu and the Save As dialog goes away.
Key Path	**Save, State, To File…**

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	**All**
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. 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.

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

Save As...

Accesses a menu that enables you to select the location where you can save the Trace. 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 Trace Save Type. The filename is filled in using the auto file naming algorithm for the State Save Type and is highlighted.

The Save As dialog is loaded with the file information related to the Trace Save Type. The filename is filled in using the auto file naming algorithm for the State Save Type and is highlighted.

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).

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

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

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 icon. After the save completes, the Advisory Event “File <register number> saved” is displayed.

Mode	**All**
Remote 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

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.
Remote Command Notes	This command actually performs a save state, which in GPSA 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…**

Data (Mode Specific)

Accesses a menu that enables you to select the type of data to export. Each mode determines what data it will allow to be exported and imported based on what data it produces. Exporting Data stores measurement data to the specified file which can then be imported into Excel, Matlab and other PC applications for viewing and manipulation. The data that is typically available in all modes is Measurement Results and this data type will not only be mode specific, but also measurement specific. An example of mode specific Export Data is Traces which is a data type typically only associated with the Spectrum Analyzer mode.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the export feature still needs to know where to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that provides the user with the options of where to save the data. Once a filename has been selected or entered in the Save As menu, the save will occur.

Mode	**All**
Dependencies/Couplings	If a file type is not used by a certain measurement, that type is grayed out for that measurement. Forceful –221.3200
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.
Preset	<mode specific>; not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode.
Key Path	**Save**

Trace

Pressing this key selects the Traces as the data type to be exported with this save request. This key brings up the Trace Menu that allows you to select which Trace to save. This key is grayed out when SA measurements are running that do not support trace exporting.

Mode	**SA**
Dependencies/Couplings	Trace data is not available from all Measurements. In that case, the key will be grayed out.
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 1, 2, 3, 4, 5, 6

These softkey selections let you pick which Trace to save; either 1, 2, 3, 4, 5, or 6. The default is 1. Once selected, the key returns back to the Export Data menu and the selected Trace 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.

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**
Key Path	**Save, Data, Trace**

Measurement Results

Measurement results are not available for all measurements. Also, different types of results are available from the different measurements. For example, this key is grayed out in the Spectrum Analyzer Mode while the active measurement is Swept SA.

Mode	All
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	WiMAX OFDMA
Key Path	**Save, Data**

Capture Data

Capture Data functionality is not available for all measurements. Also, different types of results are available from the different measurements. For example, this key is grayed out in the Spectrum Analyzer Mode while the active measurement is Swept SA.

Mode	IQ, WCDMA
Key Path	**Save, Data**

Save As...

Accesses a menu that enables you to select the location where you can save the Data Type. 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 Data Type. The filename is filled in using the auto file naming algorithm for the specific Data Type and is highlighted. The “auto file name” feature automatically generates a file name for use when saving a file.

When you navigate to this selection, you have already determined that you are saving Data and now you want to specify to which file to direct the save.When you first enter this dialog, the path in the Save In: field in this Save As dialog depends on which export data type you navigated here from. 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.

Each mode may allow additional Data Types. Examples are data files that are produced by Matlab or XML files.

Restriction and Notes	Brings up Save As dialog for saving a <mode specific> Save Type
Key Path	**Save, Data, <N> (Key number depends on mode specific Export)**

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.

Mode	**All**
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 Export Data menu and the Save As dialog goes away. Advisory Event "File <file name> saved" after save is complete.
Key Path	**Save, Data, Save As…**

Mode	All
Remote 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.
Remote Command Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.

Mode	SA
Remote Command	`:MMEMory:STORe:TRACe:DATA TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<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	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.

Mode	WiMAX OFDMA
Remote Command	`:MMEMory:STORe:ZMAP <filename>`
Example	:MMEM:STOR:ZMAP “myZoneMap.omf” saves current Zone Map as 89601 compatible file type.
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.
Key Path	**Save, Data, Zone Map**

Screen Image

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

Pressing Screen Image brings up the 2 key dialogs and their corresponding menu – Themes and Save As. When the user navigates to this selection, they have already determined they are saving a Screen Image and now they want to specify how to layout the page prior to saving and to which file to direct the save. The resulting screen image file cannot be recalled.

Mode	**All**
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. Select one of the following for more information on each theme:

- "3D Color" on page 133
- "3D Monochrome" on page 133
- "Flat Color" on page 133
- "Flat Monochrome" on page 134

Mode	All
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor | TDMonochrome | FCOLor | FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example	MMEM:STOR:SCR:THEM TDM
Preset	3D Color; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes
Key Path	**Save, Screen Image**

3D Color

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

Mode	All
Example	MMEM:STOR:SCR:THEM TDC
Key Path	**Save, Screen Image, Themes**

3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Mode	All
Example	MMEM:STOR:SCR:THEM TDM
Key Path	**Save, Screen Image, Themes**

Flat Color

Selects a format that is best when the screen is to be printed on an InkJet printer.

Mode	All
Example	MMEM:STOR:SCR:THEM FCOL
Key Path	**Save, Screen Image, Themes**

Flat Monochrome

Selects a format that is like Flat Color, but only black is used (no colors, not even gray), and no fill.

Mode	All
Example	`MMEM:STOR:SCR:THEM FMON`
Key Path	**Save, Screen Image, Themes**

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.

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

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.

Mode	**All**
Remote 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…**

Save As Dialog and Menu

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.

Mode	**All**
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. 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

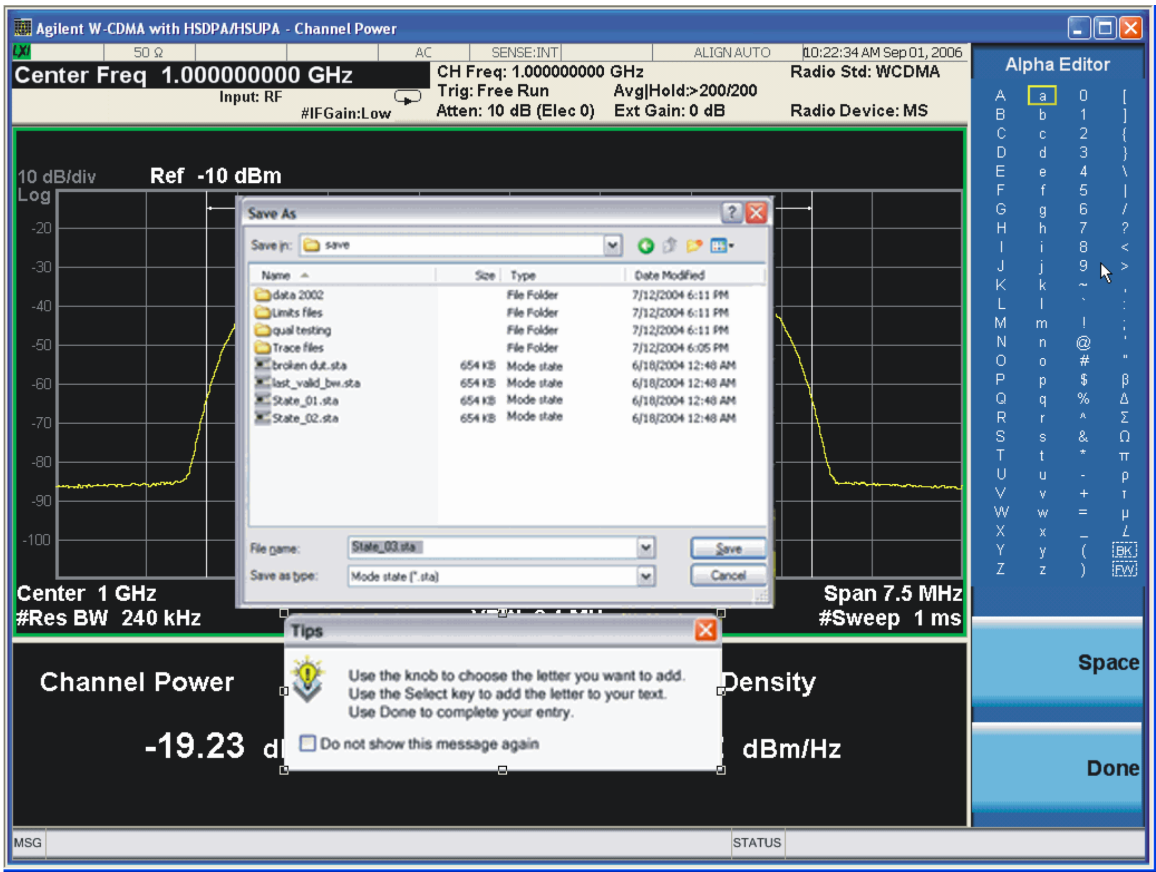
Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file.

Mode	**All**

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

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. The pulldown menu associated with the File Name: selection is not supported.



Mode	**All**
Restriction and Notes	Brings up the Alpha Editor. The editor created file name is loaded in the File name field of the Save As dialog.
Key Path	**Save, <various>, Save As...**

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.

Mode	**All**
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.
Key Path	**Save, <various>, Save As…**

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.

Mode	**All**
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
Key Path	**Save, <various>, Save As…**

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.

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

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.

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

Quick Save

The Quick Save front panel key repeats the last save in the directory. If the last save was to a register, Quick Save saves the State of the currently active mode to the next register. If the last register was register 6, it wraps around to register 1.

If the last save was to a file, Quick Save repeats the last type of save in the last save directory by creating a unique filename using the Auto File Naming algorithm. If the Quick Save is pressed when the instrument is powered up for the first time prior to pressing the Save front panel key, the Quick Save saves State to Register 1.

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

Recall

Accesses a menu that provides the options that enables you to select the Type of file to recall. The options are State, Trace and Data (Screen Image can be saved, but not recalled.) The default paths for Recall are data type dependent and are the same as for Save.

Mode	**All**
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>.
Key Path	**Recall**

State

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

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.

Mode	**All**
Example	*RCL 1
Key Path	**Recall, State**

Mode	**All**
Example	*RCL 2
Key Path	**Recall, State**

Mode	**All**
Example	*RCL 3
Key Path	**Recall, State**

Mode	**All**
Example	*RCL 4
Key Path	**Recall, State**

Mode	**All**
Example	*RCL 5
Key Path	**Recall, State**

Mode	**All**
Example	*RCL 6
Key Path	**Recall, State**

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 Look In: 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.

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

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.

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 a 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. Input/Output settings are listed under Input/Output in the Analyzer Setup Functions Section.

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.

*CLS.]

Mode	**All**
Remote Command	`:MMEMory:LOAD:STATe <filename>`
Example	:MMEM:LOAD:STAT "myState.state" recalls the file myState.state on the default path
Restriction and Notes	Auto return to the State menu and the Open dialog goes away. Advisory Event "Recalled File <file name>" after recall is complete.
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. If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed.
Key Path	**Recall, State, From File…**

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**
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. The default is 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 Look In: 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. For more details, refer to Section "File Open Dialog and Menu".

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

Open

Recalling Trace first must verify the file is recallable in this instrument by checking the 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 "Open" for details.

Mode	**SA**
Remote 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, not updating
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.
Remote Command Notes	This command actually performs a load state, which in GPSA includes the trace data, however it looks in the recalled state file to see how it was flagged at save time. The possibilities are: Flagged as a single trace save file: the trace which was flagged as the one that was saved is loaded, to the trace specified. The trace is loaded with update off and display on, and none of the other traces are loaded. Flagged as an “all traces” file: all traces are loaded. All of the traces are loaded with Update=Off to keep them from updating, regardless of the setting of “Recall State w/Trace Update”
Key Path	**Recall, Trace, Open…**

Data (Mode Specific)

Importing a data file is a way to replace current measurement data with data that was previously saved from this measurement or from other measurements that produce the same type of data. This import feature also allows the user to import data from different modes that produce the same type of data. The Import Menu only includes Data Types that are supported by the current mode. Based on the currently active measurement, Data Types that are not relevant to the currently active measurement may be grayed out in the menu.

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.

When this key is pressed, the user has determined that they want to Import Data. Each mode determines what data it will allow to be exported and imported based on what data it produces. Importing Data loads measurement data from the specified file into the destination implied by the Import Data Type selected. The one data type that is available to all modes is Amplitude Corrections. The other data that is typically available in all modes is Measurement Results, but Measurement Results can not be imported. Other examples of mode specific Import Data are Traces and Limits which are Import Data associated with the Spectrum Analyzer mode.

The mode specific Import Data can be grayed out depending on the specific measurement that is running within the mode. For example, when in the SA mode and in the ACP measurement, the Trace Import Data is grayed out, since a user trace (Trace1, Trace2, …) is not relevant when the ACP measurement is running.

Selecting an Import Data menu key will not actually cause the importing to occur, since the recall feature 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 the user 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. See Section "File Open Dialog and Menu" for more details.

Mode	**All**
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>; not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode.
Key Path	**Recall**

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.

Mode	**SA**
Dependencies/Couplings	Trace data is not available from all Measurements. In that case, the key will be grayed out.
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**
Key Path	**Recall, Data, Trace**

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	WiMAX OFDMA
Key Path	**Recall, Data**

File 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.

Mode	**All**
Restriction and Notes	Brings up Open dialog for recalling a <mode specific> Save Type
Key Path	**Recall, Data, <N> (Key number depends on mode specific Export)**

Open

The import starts by checking that all is well. If the file specified is empty an error is generated (If the specified file does not exist, another error is generated If there is a mismatch between the file and the proper file type, an error is generated.

If there is a mismatch between the file version or model number or instrument version or model number, a warning is displayed Note that if there is a mismatch between file version or model number or instrument version or model number, the import still tries to load as much as possible.

Now 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, N error message will appear.

Mode	**SA**
Remote 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	If the file is empty, error –250.3005 is reported. If the file does not exist error –256 is reported. If there is a mismatch between the file and the destination data type, an error is reported. –250.3003. If the number of points in the file don't match the current SA points, an error is reported. –250.3006.

Mode	WiMAX OFDMA
Remote 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

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. The open behavior is enough different between State and Data that it is fully described in the corresponding State and

Data sections – Section Open.

Mode	**All**
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.

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

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.

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

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.

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

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.

Mode	**All**
Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order

Key Path	**Recall,<various>,Open..., Sort**

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.

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

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.

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

Ascending

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

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

Descending

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

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

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.

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

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.

Mode	**All**
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.
Key Path	**Recall, <various>, Open...**

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.

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

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 (bc)	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

Spectrum Analyzer Mode - Preset Information

The **Mode Preset** key sets most analyzer functions to their default values. They are listed below. Also shown is a list of MXA persistent settings and their default values.

Because the Input/Output function is common to all modes and all measurements, those default settings are also listed here. These are set when you select the **Mode Preset** key as well.

This key also performs the following functions:

Activates the Swept SA measurement.

Brings up the Freq/Channel menu.

Clears any trace that is active after the preset but does not change the data in inactive traces.

Spectrum Analyzer Mode Preset Settings and their default values

SA Mode, Preset Settings	Default Value(s)
AC/DC	AC
ADC Dither	Off
Amplitude corrections	Off
Amplitude correction frequency interpolation	Linear
Amplitude correction selection	1
Amplitude corrections apply	Off
Antenna corrections	Off
Annotation and graticule	On
Annotation - extended panel	Off
Annotation - trace	Auto
Attenuation (coupled function)	10 dB
Attenuation step	10 dB
Average count	100
Average type (coupled function)	Log Pwr
Byte order	Normal
Center frequency:	
Option 503	1.805 GHz
Option 508	4.205 GHz
Option 513	6.805 GHz
Option 526	13.255 GHz
CF step size (coupled function)	10 % of Span
Continuous peak search	Off
Coupled functions	All set to Auto
Detector (coupled function)	Normal
Display enable	On
Display line	Off
Display line level	–25 dBm
FFT/Span (coupled function)	1
Frequency offset	0 Hz

Frequency scale	Linear
Limit line display	Off
Limit line domain	Frequency
Limit line control domain	Fixed
Limit line table	Off
Limit line test state	Off
Log scale (amplitude)	10 dB/division
Marker count	Off
Markers mode	Off
Marker couple	Off
Marker lines	Off
Marker function	Off
Marker function band span	5 % of Span
Marker function band interval left	5 % of Span
Marker function band interval right	5 % of Span
Marker table	Off
Marker trace (coupled function)	Trace1
Marker x:	
Option 503	1.805 GHz
Option 508	4.205 GHz
Option 513	6.805 GHz
Option 526	13.255 GHz
Marker x position	501
Marker x readout (coupled function)	Frequency
Marker y	0 dBm
Max mixer level	–10 dBm
Normalize	Off
Normalize reference level	0 dB
Normalize reference position	0
N DB points	Off
N DB points offset	–3.01 dB
Peak readout	All

Peak excursion	6.0 dB
Peak excursion state	Off
Peak sort	Frequency
Peak table	Off
Peak threshold	–90 dBm
Peak threshold state	Off
Phase noise option (coupled function)	Fast tune
Preselector adjust	0 Hz
Preselector select	3–26 GHz
Reference level	0 dBm
Reference level offset	0 dBm
Resolution bandwidth (coupled function)	3 MHz
Resolution bandwidth filter type	Gaussian
Resolution bandwidth filter bandwidth	DB3
Scale type	Log
Signal track	Off
Span:	
Option 503	3.59 GHz
Option 508	8.39 GHz
Option 513	13.59 GHz
Option 526	26.49 GHz
Span/RBW ratio (coupled function)	106
Span Zone	Off
SRQ mask?	40
Start frequency	10 MHz
Stop frequency:	
Option 503	3.6 GHz
Option 508	8.4 GHz
Option 513	13.6 GHz
Option 526	26.5 GHz
State registers	Unaffected
Sweep control	Continuous

Sweep points	1001
Sweep spacing (frequency scale)	Linear
Sweep time (coupled function)	66.24 ms (option dependent)
Sweep type (coupled function)	Swp
Title	Cleared
Trace display	1, 0,0,0,0,0
Trace copy source, destination	Trace1, trace2
Trace exchange source, destination	Trace1, trace2
Trace math	Off
Trace math first operand	5,6,1,2,3,4
Trace math second operand	6,1,2,3,4,5
Trace numeric data format	Ascii
Trace type	Clearwrite
Trace update	1,0,0,0,0,0
TV monitor	Off
Video Bandwidth (coupled function)	3 MHz
VBW/RBW ratio (coupled function)	1.000
Y axis units	dBm
Trigger	Freerun
Trigger ATrigger	100.0 ms
Trigger ATrigger state	Off
Trigger External 1 delay	1.000 ms
Trigger External 1 delay state	Off
Trigger External 1 level	1.2 V
Trigger External 1 periodic timer level	1.2 V
Trigger External 1 periodic timer slope	Positive
Trigger External 1 slope	Positive
Trigger External 2 delay	1.000 ms
Trigger External 2 delay state	Off
Trigger External 2 level	1.2 V

Trigger External 2 periodic timer level	1.2 V
Trigger External 2 periodic timer slope	Positive
Trigger External 2 slope	Positive
Trigger Holdoff	100.0 ms
Trigger Holdoff state	Off
Trigger Line delay	1.000 ms
Trigger Line delay state	Off
Trigger Line level	1.2 V
Trigger Line slope	Positive
Trigger periodic timer	20 ms
Trigger periodic timer adjust	0.00 s
Trigger periodic timer sync source	Off
Trigger RF Burst delay	1.000 ms
Trigger RF Burst delay state	Off
Trigger RF Burst level	1.2 V
Trigger RF Burst level absolute	0.0 dBm
Trigger RF Burst level relative	–6.0 dB
Trigger RF Burst periodic timer selectivity state	Off
Trigger RF Burst periodic timer level absolute	0.0 dBm
Trigger RF Burst periodic timer level relative	–6.0 dB
Trigger RF Burst periodic timer slope	Positive
Trigger RF Burst periodic timer level type	Absolute
Trigger RF Burst periodic timer selectivity	Off
Trigger RF Burst slope	Positive
Trigger source	Off
Trigger Video delay	1.000 ms
Trigger Video delay state	Off
Trigger Video level	1.2 V
Trigger Video level frequency	0 Hz
Trigger Video slope	Positive
Trigger TV FMode	Entire

Trigger TV line	17
Trigger TV slope	Positive
Trigger TV Source	SAnalyzer
Trigger TV Standard	NTSC-M

Persistent Settings and their default values

MXA Persistent Settings	Default Value(s)
E/I Input Correction selection	1
E/I Limit Line selection	1
E/I Trace selection	1
Export Data Type	Trace
Import Data Type	Trace
Last Save To Name	1
Last Save To Type	Register
Last Save Type	State
Limit Line Ampl. Interpolation	Log
Limit Line Interpolation	Linear
Limit Line Margin States	OFF
Limit Line Margins	0
Limit Line Types	Upper, Lower
Marker References	2,3,4,5,6,7,8,9,10,11,12,1

Input/Output Settings and their default values

Settings	Default Value(s)
Amplitude Reference	AREF_50MHZ
Analog Out	SA
BTS (ext gain for base station test)	0 dB
Data Source	Input
Down Converter Analog Out Channel 1	Log Video
Down Converter Analog Out Channel 2	Off
External Amp Gain	0 dB

External Mixer Band	A
I Offset	0.00 V
I/Q Input Z	UIMohm (1 mohm)
I/Q Voltage Range	1.00 V
I/Q Z Ref for Input Z	50 ohms
Input Corrections	Off
Input Correction Interpolation	Linear
Input Correction Selection	1
Input Corrections Apply	Off
Input Antenna Corrections	Off
Input Port	RF
Input Z Corr	50 ohms
Microwave Preselector	Off
Mixer Bias	0
Mixer Bias State	Off
Mixer Harmonic (coupled function)	–8
Mixer Type	Unpreselect
MS (ext gain for mobile station test)	0 dB
Polarity	Positive
Pre Amp Gain	0 dB
Q Offset	0.00 V
SA Channel 1	Log Video
SA Channel 2	Off
Signal ID	Off
Signal ID Mode	ISuppress
Trigger 2 Output	Main

User Preset

User Preset behaves similarly to **Recall State** in that it recalls a hidden Save State file with the exception that **User Preset** will never cause a mode switch. Recalling a Save State file may cause a mode switch, if the Save State file was saved while in a different mode. There is a User Preset file per mode. The User Preset file is a Save State file. **User Preset** sets the state of currently active mode back to the state that was previously saved for this mode using the **Save User Preset** menu key or the `SYST:PRES:USER:SAVE` command. Each mode will have no knowledge of another user preset file from any other mode or how to invoke them. 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.

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 at power-on when each 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 Settings Defaults.

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.
- 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.

NOTE	My Documents must be located on the user data partition.

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.

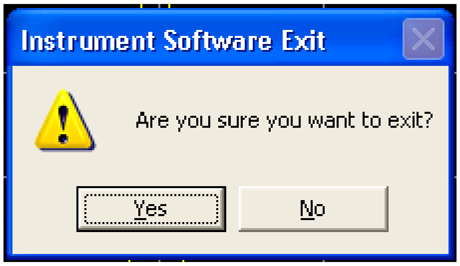
Mode	All
Remote Command	`:SYSTem:PRINt:THEMe TDColor	TDMonochrome	FCOLor	FMONochrome` `:SYSTem:PRINt:THEMe?`
Example	:SYST:PRIN:THEM FCOL
Preset	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes
State Saved	No

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**

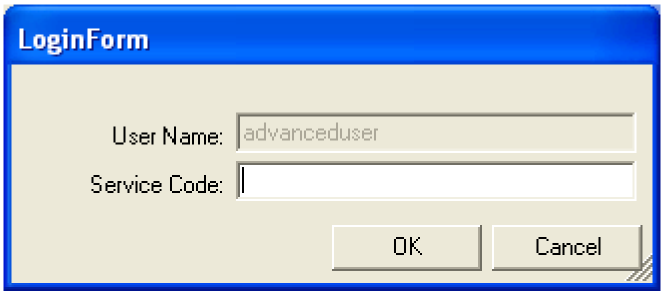
Print

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**

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” (or the factory image). The first access to the Service Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Service Menu are unimpeded. The Authentication dialog looks like:



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

Key Path	**System**

Diagnostics

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

Key Path	**System**

Show Hardware Statistics

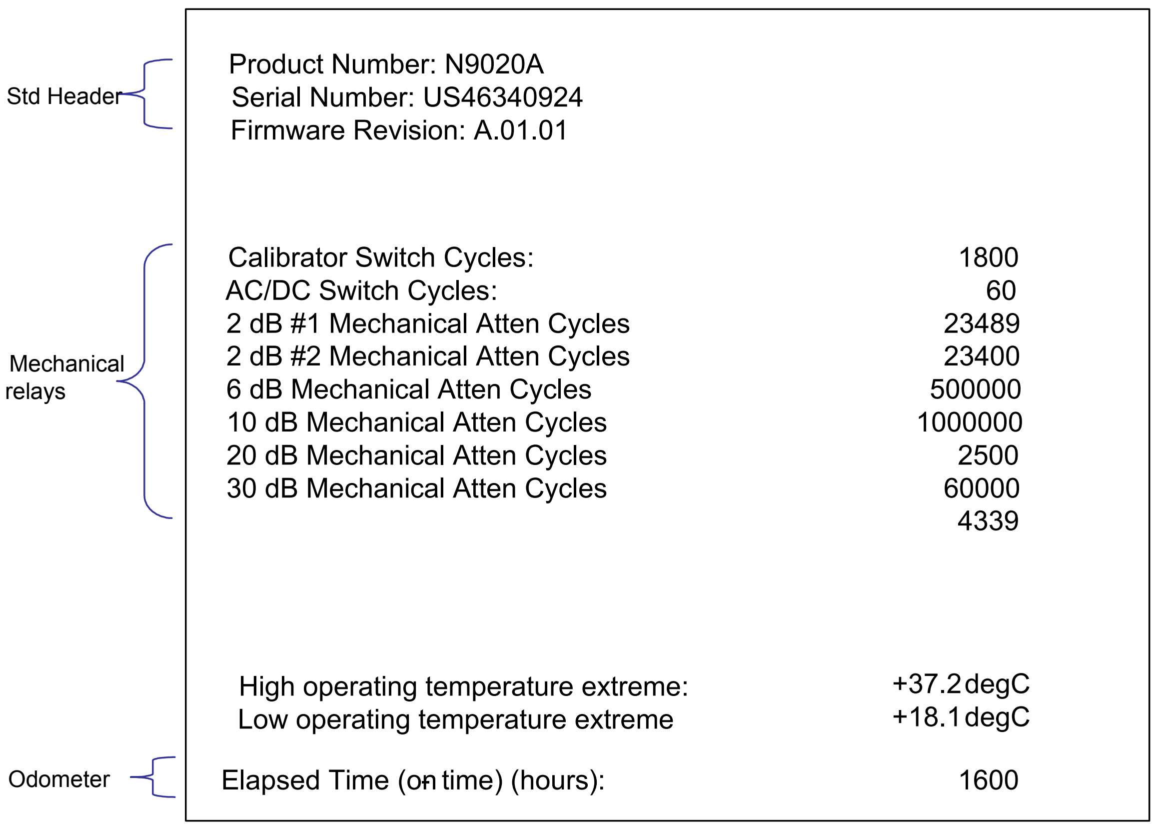
Provides a display of various hardware statistics. The statistics include the following:

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 queried.

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.

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

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.

Saved State	No

Mode	All
Remote Command	`:SYSTem:TEMPerature:HEXTreme?`
Example	:SYST:TEMP:HEXT?
Restriction and Notes	Value is in degrees Centigrade at which the highest operating temperature has been recorded since 1st power-up.

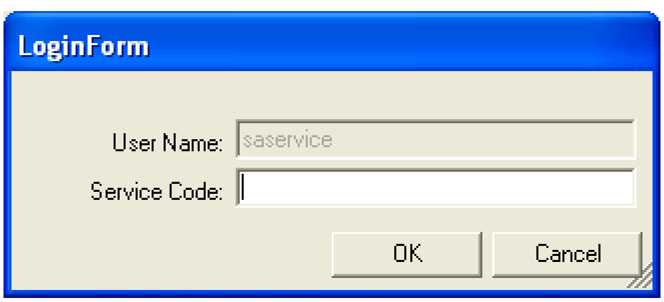
Query the Elapsed Time since 1st power on

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 traverse into this menu.**
Key Path	**System, Diagnostics**

License Remote Commands

There are five remote commands available for licensing.

Remote Command	`SYSTem:LKEY <"OptionInfo">`
Example	SYST:LKEY “N9073A–1FP” SYST:LKEY “N9073A–1F1,1.000” SYST:LKEY “N9000–001,1.000”
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. Because the system knows which version is supported for each feature.

Remote Command	`SYSTem:LKEY:DELete <"OptionInfo">`
Example	SYST:LKEY:DEL “N9073A–1FP” SYST:LKEY:DEL “N9073A–1F1,1.000”
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.

Remote Command	`SYSTem:LKEY:LIST?`
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

NOTE <arbitrary block data> is an <IEEBlock> format. The format of an IEEBlock 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

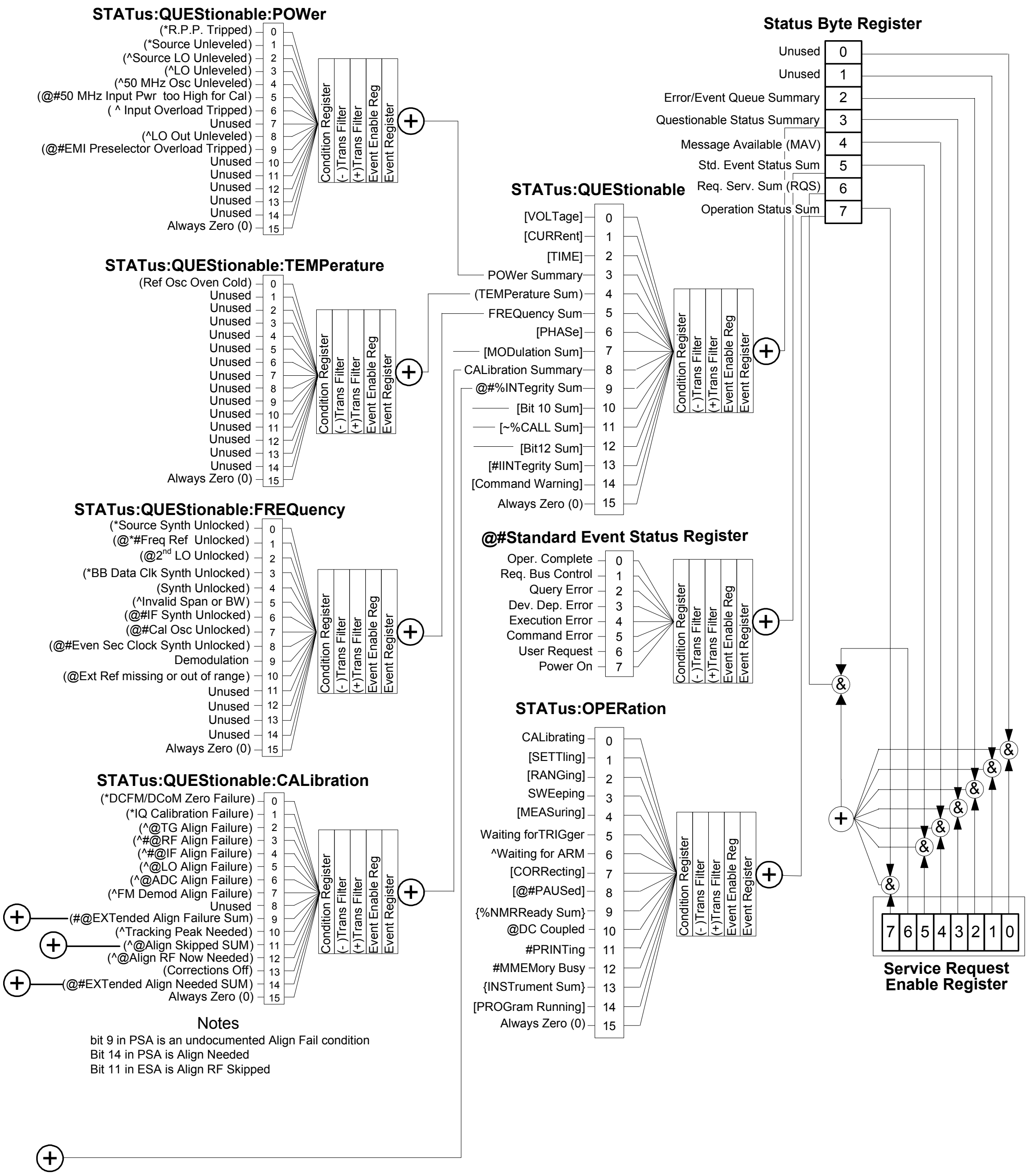
Return Value	<”LicenseInfo”> if the license is valid, null otherwise. <”LicenseInfo”> contains the signature, the expiration date, and serial number if transportable.
Return value Example	“B043920A51CA”
Remote Command	`SYSTem:LKEY? <"OptionInfo">`
Example	SYST:LKEY? “N9073A–1FP”
Remote Command Notes	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.

Remote Command	`SYSTem:HID?`
Return Value	Return value is the host ID as a string

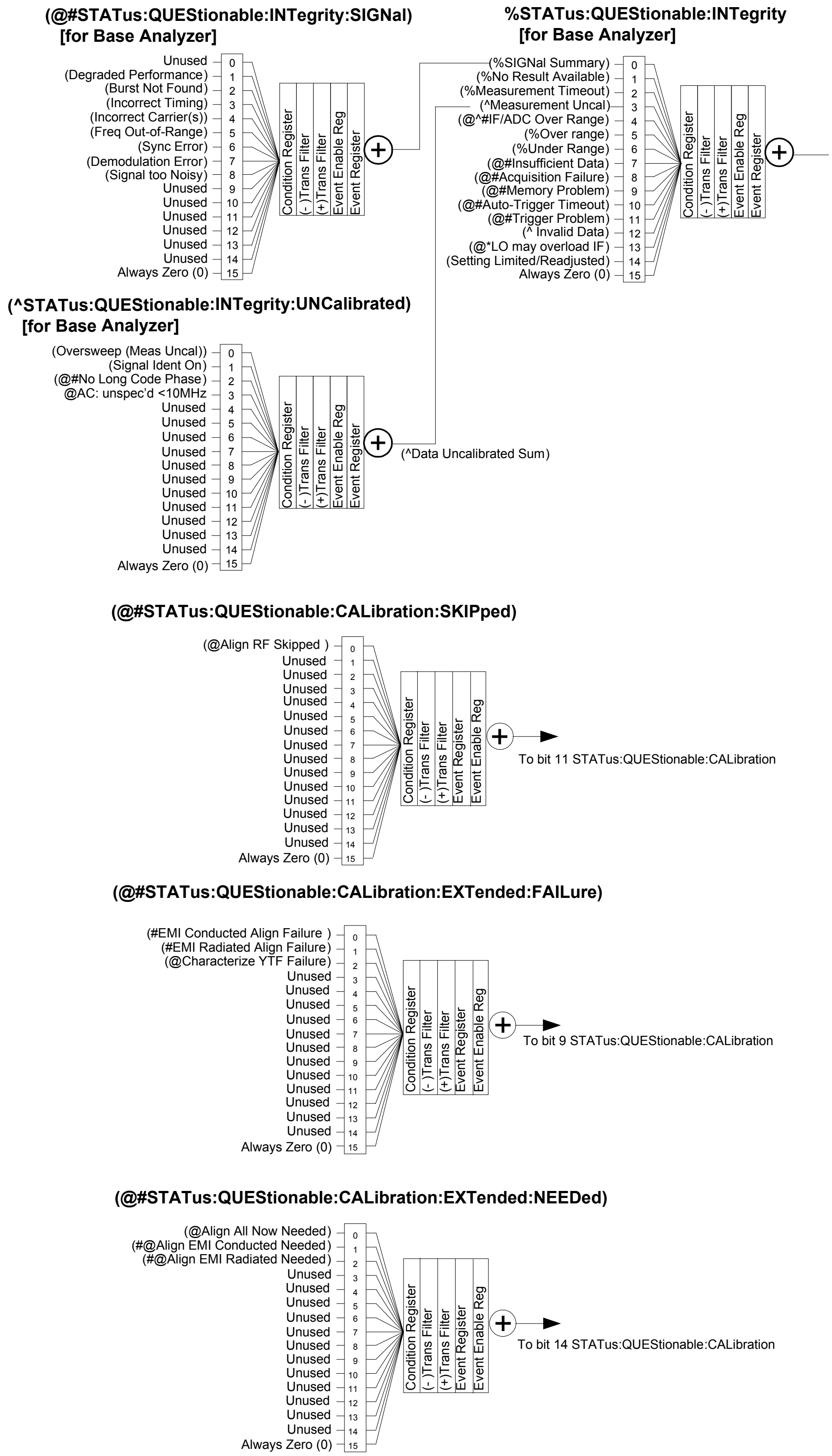
STATus Subsystem (No equivalent front panel keys)

The following graphics show the overall status register system.

Overall Status Byte Register System



Additional Fanout



Detailed Description

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

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

What Are Status Registers

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

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

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

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

1. The summary outputs from the six STATus:QUEStionable:<keyword> detail registers are inputs to the STATus:QUEStionable register.

2. The summary output from the STATus:QUEStionable register is an input to the Status Byte Register. See the overall system in Figure at the beginning of this section.

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

What Are Status Register SCPI Commands

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

- *CLS (clear status) clears the status byte by emptying the error queue and clearing all the event registers.
- *ESE, *ESE? (event status enable) sets and queries the bits in the enable register part of the standard event status register.
- *ESR? (event status register) queries and clears the event register part of the standard event status register.
- *OPC, *OPC? (operation complete) sets the standard event status register to monitor the completion of all commands. The query stops any new commands from being processed until the current processing is complete, then returns a ‘1’.
- *PSC, *PSC? (power-on state clear) sets the power-on state so that it clears the service request enable register and the event status enable register at power on.
- *SRE, *SRE? (service request enable) sets and queries the value of the service request enable register.
- *STB? (status byte) queries the value of the status byte register without erasing its contents.

How to Use the Status Registers

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

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

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

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

Use the SRQ method when:

- you need time-critical notification of changes
- you are monitoring more than one device which supports SRQs
- you need to have the controller do something else while waiting
- you can not 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 do not 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.

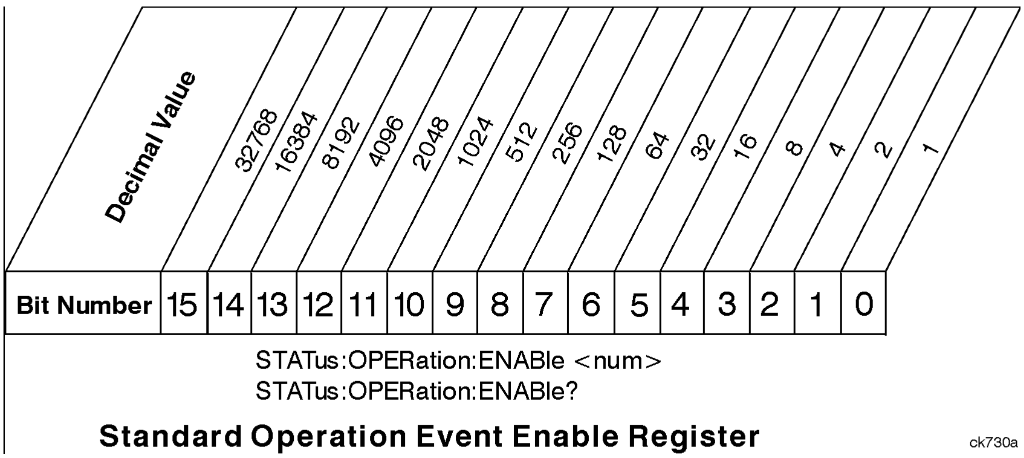
- Monitor a particular type of change in a condition (bit).
  - — The transition registers are preset to register if the condition goes from 0 to 1 (false to true, or a positive transition).
  - — This can be changed so the selected condition is detected if the bit goes from 1 to 0 (true to false, or 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 the next figure. 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.

NOTE 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.

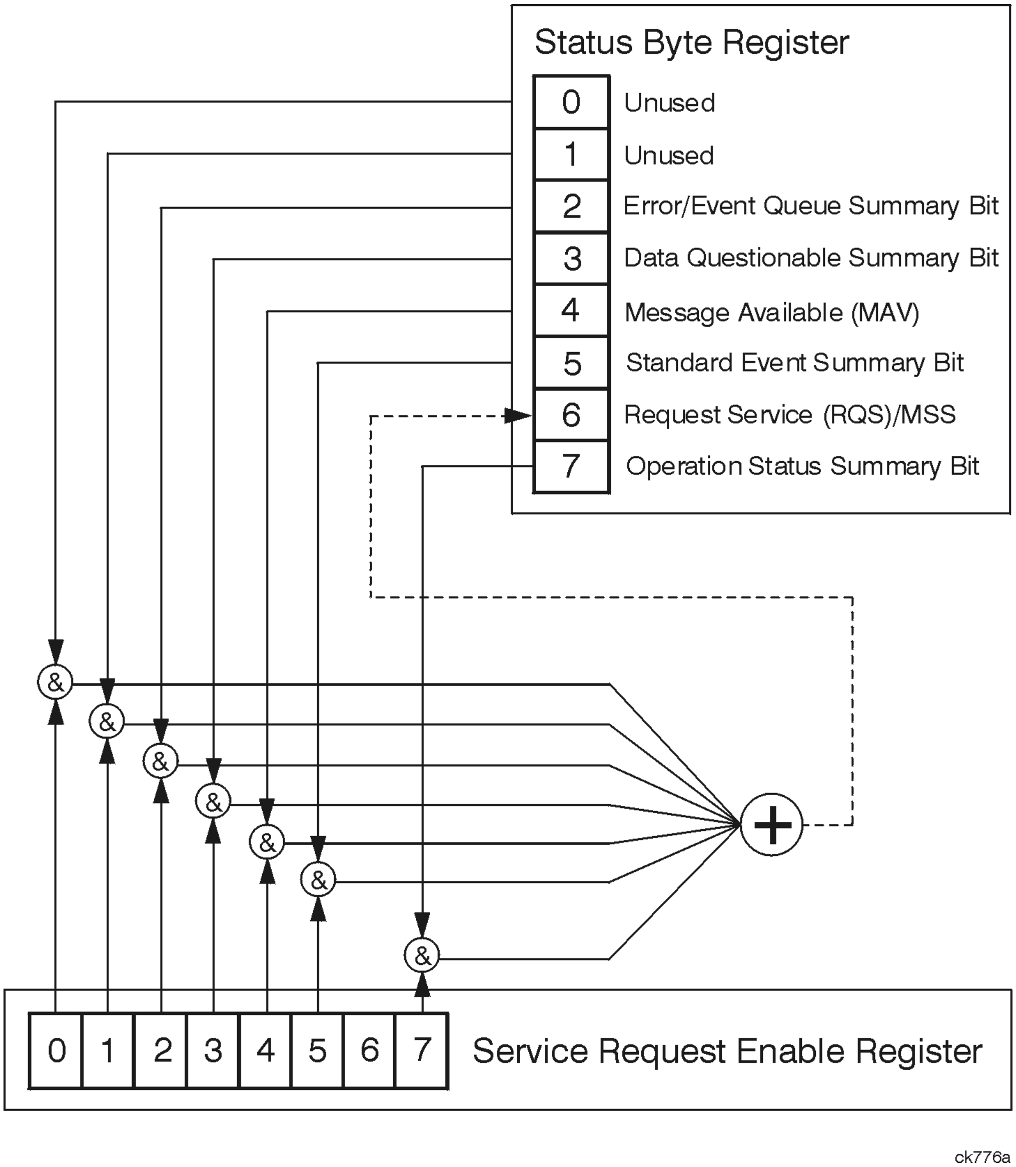
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

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

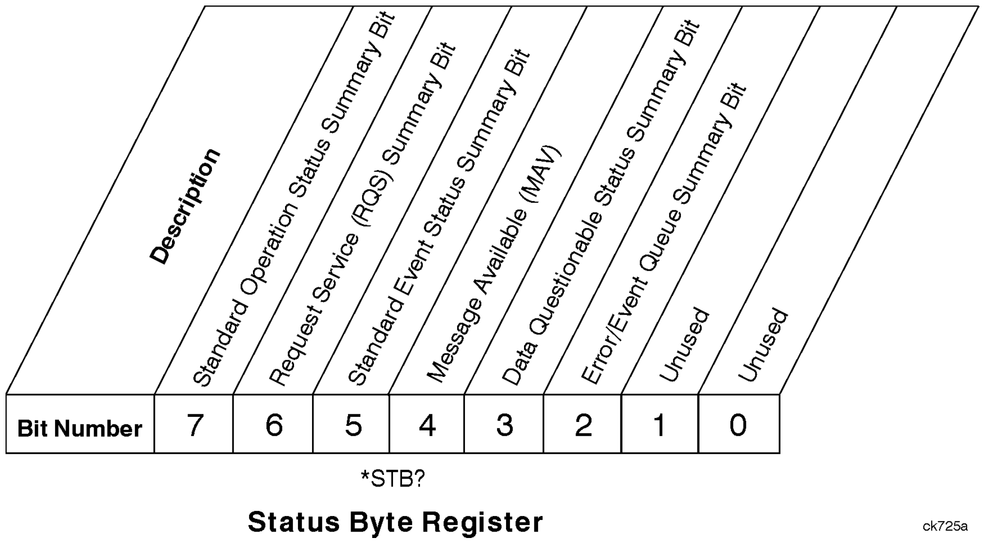
Status Register System

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 for information about the bit assignments and status register interconnections.

The Status Byte Register



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



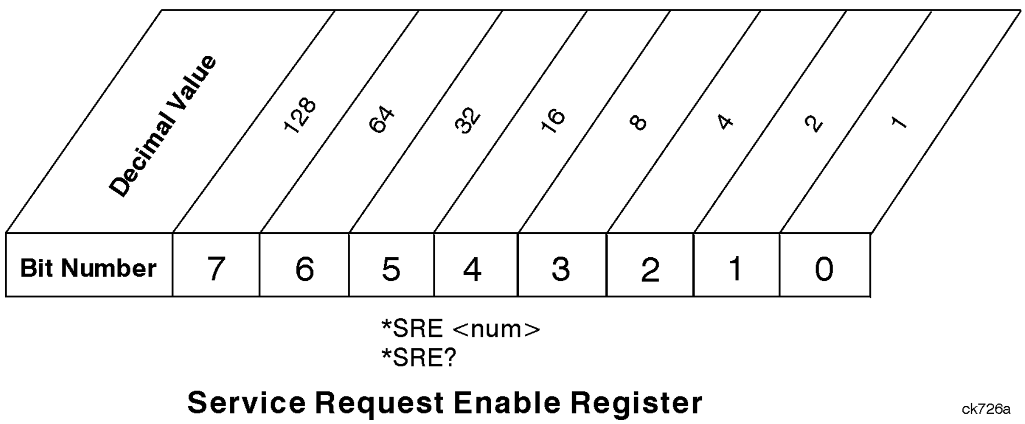
Bit	Description
0, 1	These bits are always set to 0.
2	A 1 in this bit position indicates that the SCPI error queue is not empty which means that it contains at least one error message.
3	A 1 in this bit position indicates that the data questionable summary bit has been set. The data questionable event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

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

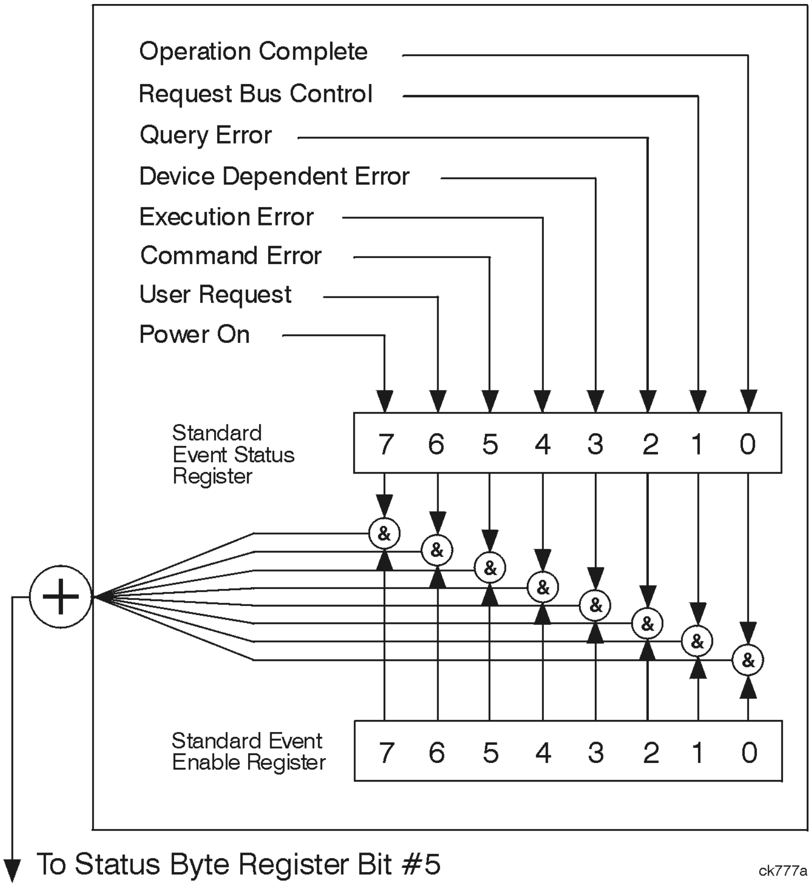
In addition to the status byte register, the status byte group also contains the service request enable register. This register lets you choose which bits in the status byte register will trigger a service request.

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

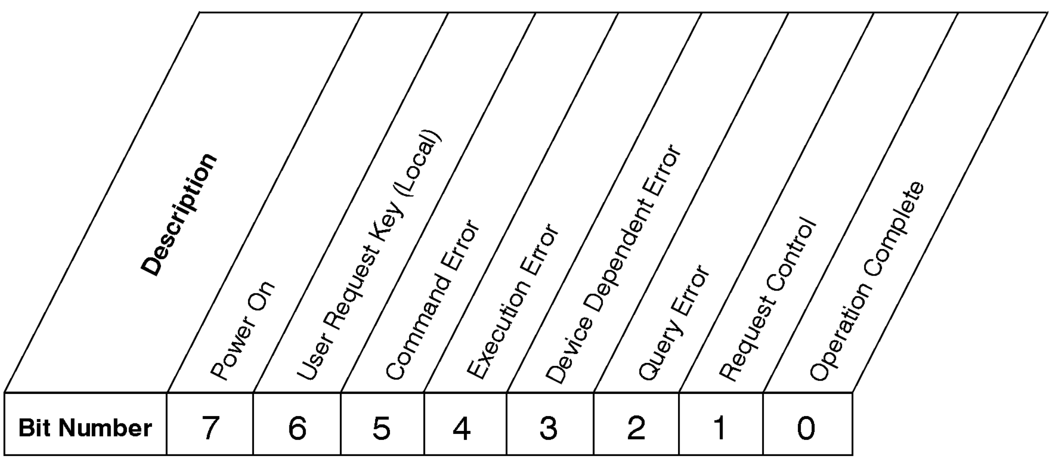
The service request enable register presets to zeros (0).



Standard Event Status Register



The standard event status register contains the following bits:



*ESR?

Standard Event Status Register

ck727a

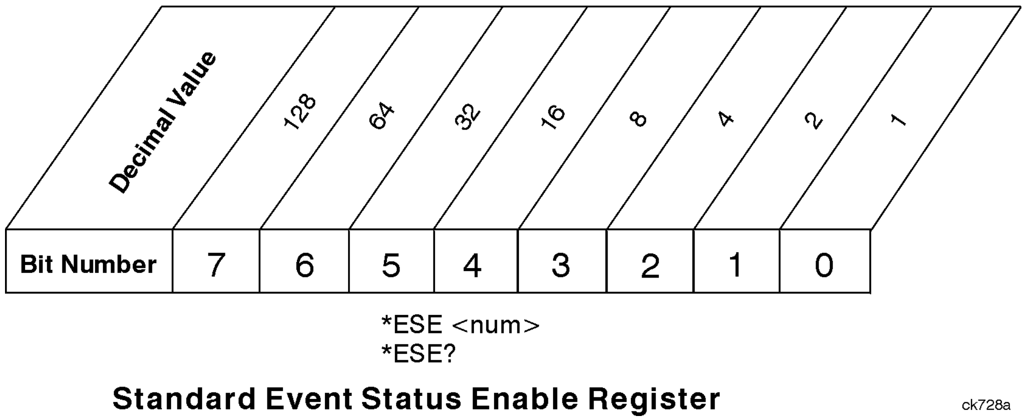
Bit Description

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

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

In addition to the standard event status register, the standard event status group also contains a standard event status enable register. This register lets you choose which bits in the standard event status register will set the summary bit (bit 5 of the status byte register) to 1. Send the *ESE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable. For example, to enable bit 7 and bit 6 so that whenever either of those bits is set to 1, the standard event status summary bit of the status byte register will be set to 1, send the command *ESE 192 (128 + 64). The command *ESE? returns the decimal value of the sum of the bits previously enabled with the *ESE <integer> command.

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



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 an 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. (for example, 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.

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

Mode	All
Remote Command	`:STATus:OPERation:ENABle <integer>` `:STATus:OPERation:ENABle?`
Example	STAT:OPER:ENAB 1 Sets the register so that Align Now operation will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
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

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

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

current conditions.

Mode	All
Remote Command	`:STATus:QUEStionable:POWer:CONDition?`
Example	STAT:QUES:POW:COND?
Preset	0
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 The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
Remote Command	`:STATus:QUEStionable:POWer[:EVENt]?`

Example	STAT:QUES:POW?
Preset	0
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 Commands

Numeric values for bit patterns can be entered using decimal or hexidecimal representations. (for example, 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]?

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,US00000713,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,FPR”. 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 a firmware revision equal to 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

Reset

This command does a Mode Preset and selects single sweep/measurement. It does not change the mode, and only resets the parameters for the current mode. And it does not do a *CLS which would clear the STATus bits and the error queue.

Remote Command	`*RST`
Example	*RST Presets the settings of the current mode.
Restriction and Notes	See the Mode Preset key description for more details about the implementation.

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.

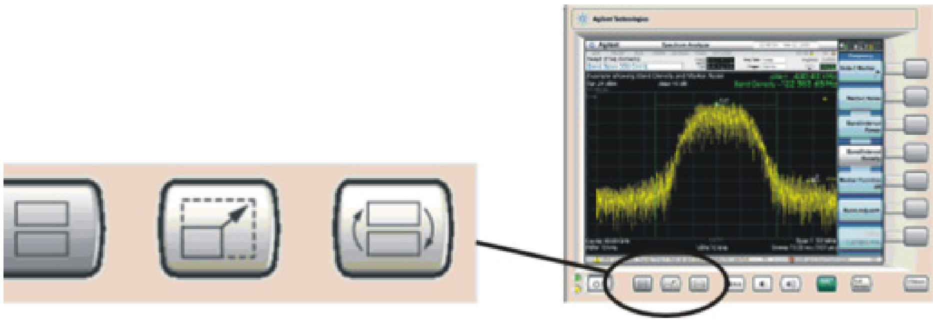
Wait-to-Continue

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.

Display 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 Zoom Next Window

Multi-Window

The **Multi Window** front-panel key is a Measurement dependent key. Each Measurement in a mode may define the operation of the **Multi-Window** key as most appropriate for that Measurement. It may do nothing. It may invoke a different measurement or a different view or both. It may toggle or step though multiple choices.

If **Multi-Window** is pressed in a Measurement for which its use is not defined, one of two warnings is generated:

“This measurement is always in a Multi-Window view.” (for multi-window measurements that can’t turn off Multi-Window), or

“There is no Multi-Window view for this Measurement.” (for measurements for which Multi-Window operation is undefined).

For example, in the Swept SA measurement, **Multi-Window** switches to the Alternate Sweep View with Zone Markers turned on.

A Measurement may elect to provide controls that vary the relative duty cycles of a multi-window view, so that (for example) the top window in a two-window display sweeps once for every five sweeps of the bottom window. These controls would be found in the View/Display menu. See the Navigation example.

Key Path	**Front-panel key**

Zoom

Zoom is a toggle function. Pressing the Zoom key once enlarges the selected window; pressing this key again returns the window to normal size.

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

Only primary windows can be zoomed.

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.

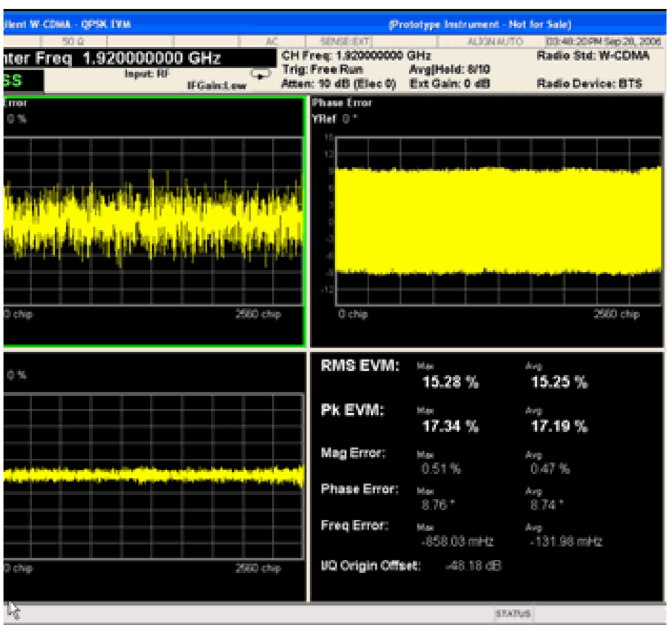
Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

If you have a mouse and you double click on a window, that window is selected and zoomed.

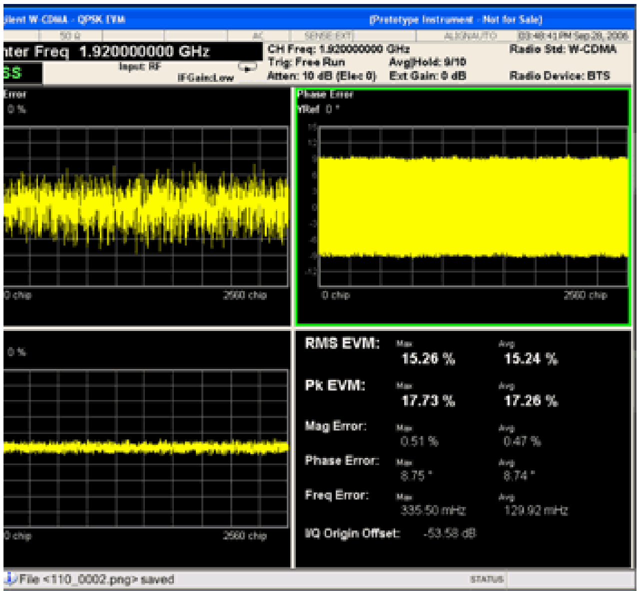
Key Path	**Front-panel key**

Navigation Example

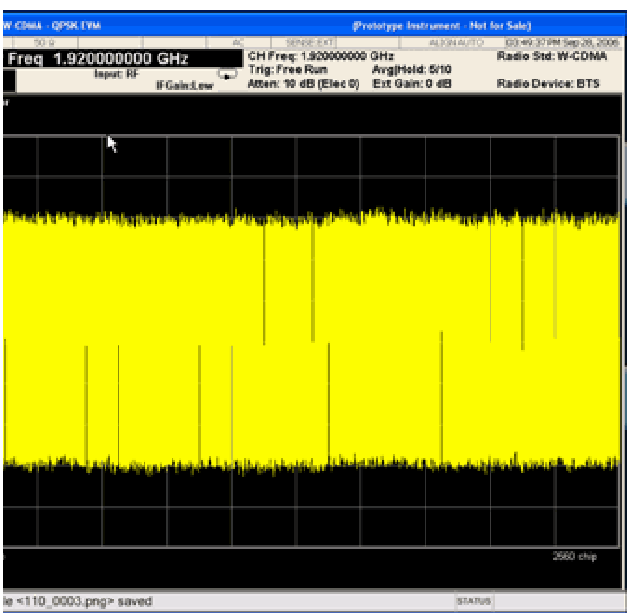
In the example below, we start in a four-window state with Window 1 selected:



Now Next Window has been pressed, so Window 2 is selected:



Now Zoom has been pressed, so window 2 has been zoomed:



If a secondary window had been present, its size and position would have remained unchanged while the primary windows were being selected and zoomed.

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.

Selected Window

One and only one primary 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.

All windows have a 3 pixel wide boundary. The selected window has a green boundary. If a window is not selected, its boundary is gray.

Only primary windows may be selected.

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

If you have a mouse and you click on a window, that window is selected.

Navigating Windows

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

Window precedence

The standard precedence that is used for primary windows is left/right top/bottom; that is, in the 4 primary-window case, window 1 is the top left, window 2 is the top right, window 3 is the bottom left, window 4 is the bottom right.

Secondary windows have no precedence; they are never selected.

Select Display Format Tiled (remote command only)

Sets the display format for the current measurement to “un-zoomed”. This is the preset state of all measurements.

Remote Command	`:DISPlay:WINDow:FORMat:TILE`
Example	:DISP:WIND:FORM:TILE

Select Display Format Zoomed (remote command only)

Sets the display format for the current measurement to “zoomed”. Zooms the currently selected window.

Remote Command	`:DISPlay:WINDow:FORMat:ZOOM`
Example	:DISP:WIND:FORM:ZOOM

Window Focus Move Control (remote command only)

Selects a window for control and zooming for the current measurement.

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>

3 Analyzer Setup Functions

This section describes generic analyzer setup functionality. These functions can change depending on the currently selected Measurement. This is common MXA 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 802.16 OFDMA mode must be selected. (INSTrument:SELect SA)

AMPTD Y Scale

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

Key Path	**Front-panel key**

Reference Level

The reference level specifies the amplitude of a signal which would be displayed on the top graticule line.

Changing the reference level does not restart a measurement, and instead adjusts all displayed traces and markers to the new value. If a change to the reference level changes an auto-coupled attenuation value, the measurement will be restarted.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WIND:TRAC:Y:RLEV 20 dBm Sets the reference level to 20 dBm, which displays in the current Y axis unit. For example, if the Y axis unit is dBμV, then 126.99 dBμV will be displayed.
Dependencies/Couplings	The value is constrained within the MAX and MIN values, but is otherwise generally not adjusted. Note: If you reduce the attenuation setting, the analyzer may have to lower the reference level to maintain the proper level at the top of the screen. If you then increase attenuation, the reference level does not increase to its previous value.
Preset	0 dBm
State Saved	Saved in State
Min	RefLevelMin = –170 dBm + RefLevelOffset - ExtGain.
Key Path	**AMPTD**
Default Unit	Depends on the current selected Y axis unit.
Annotation	The reference level is displayed above and to the left of the graticule with the title “Ref”.

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 measurement.

All parameters in the Attenuation menus are Meas Global, meaning they are unaffected by Meas Preset.

Key Path	**AMPTD** Y Scale

Mech Atten Auto/Man

You can modify the mechanical attenuation applied to the RF input signal path with this feature. 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 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.

Remote Command	`[:SENSe]:POWer[:RF]:ATTenuation <rel_ampl>` `[:SENSe]:POWer[:RF]:ATTenuation?`
Example	POW:ATT 20 Sets the attenuator to manual mode, and sets the value to 20 dB.
Dependencies/Couplings	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, listed below. 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 (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. for example, 50.01 dB would change to 60 dB (for a 10dB attenuation step).
Preset	Auto
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	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.

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 the knob, 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 the 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 the 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 the 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 the total attenuation 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 - (for example, 57 dB would change to 58 dB when the Mech Atten Step is 2 dB.)

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.

Remote Command	`[:SENSe]:POWer[:RF]:EATTenuation:STATe OFF|ON|0|1` `[:SENSe]:POWer[:RF]:EATTenuation:STATe?`
Remote Command Example	POW:EATT ON
Dependencies/Couplings	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 Elec Atten is enabled, then the Stop Freq of the analyzer is limited to 3.6 GHz. See Frequency section.
Preset	OFF
State Saved	Saved in instrument state.
Key Path	**AMPTD, Attenuation**

Elec Atten

You can modify the electrical attenuation using this function

Remote Command	`[:SENSe]:POWer[:RF]:EATTenuation <rel_ampl>` `[:SENSe]:POWer[:RF]:EATTenuation?`
Restriction and Notes	Electrical Attenuation specification is defined only when Mechanical Attenuation is 6 dB.
Dependencies/Couplings	When Enable Elec Atten is off, the Elec Atten key is grayed out.
Preset	0 dB
State Saved	Saved in instrument state.
Min	0 dB
Max	24 dB
Key Path	**AMPTD, Attenuation**

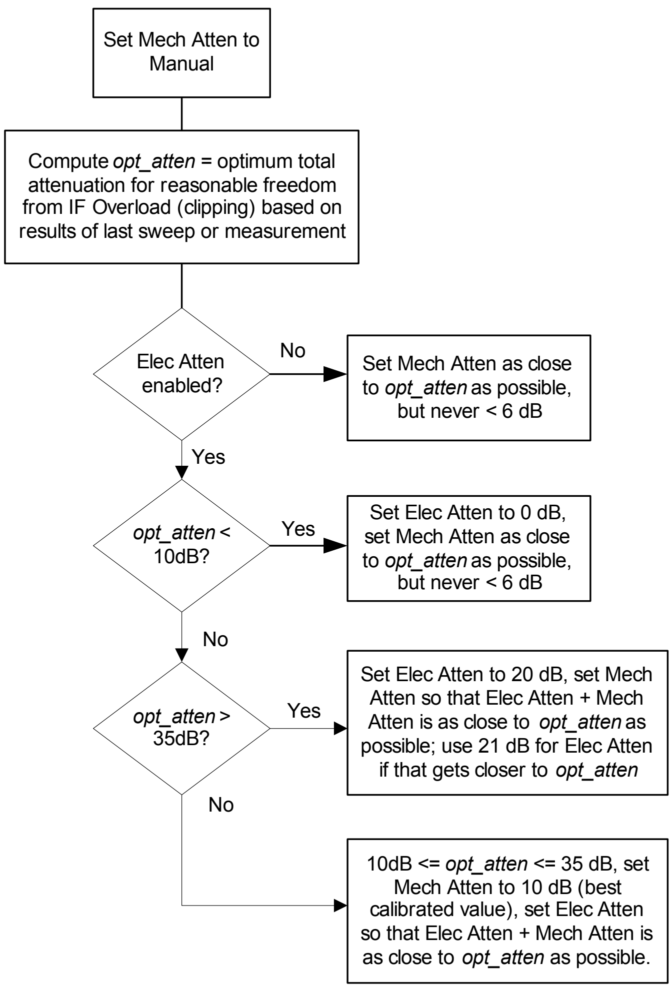
Adjust Atten for Min Clip

This function is similar to the "Optimize Ref Level" function. 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.

The algorithm to be used is as follows:



Remote Command	`[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMediate`
Key Path	**AMPTD, Attenuation**

Pre-Adjust for Min Clip

When on, it executes the adjustment algorithm 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.

Remote Command	`[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF|ELECtrical|COMBined` `[:SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?`
State Saved	Saved in State
Key Path	**AMPTD, Attenuation**

Remote 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

Sets the optional attenuation Off.

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

Elec Atten Only

Sets the optional attenuation to Electrical.

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

Mech + Elec Atten

Sets the optional attenuation to a combination of mechanical and electrical.

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.

Remote Command	`[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement] 10dB | 2dB` `[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement]?`
Example	POW:ATT:STEP 2
Dependencies/Couplings	When the attenuation step size changes, the current mechanical attenuation value is adjusted (if necessary) to be quantized to the new step size. For example, if step is set to 10 dB, mechanical attenuation is increased if necessary so it is a multiple of 10 dB
Remote Command Notes	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	2 dB
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.

Remote 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 Unit	Depends on the current selected Y-axis unit.

Scale / Div

Sets the units per vertical graticule division on the display. This function is only available when Scale Type (Log) is selected and the vertical scale is power. When Scale Type (Lin) is selected, Scale/Div is grayed out.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WIND:TRAC:Y:PDIV 5 DB
Dependencies/Couplings	Scale/Div is grayed out in linear Y scale. Sending the equivalent SCPI command does change the Scale/Div, though it has no affect while in Lin.
Preset	10.00 dB / Div
State Saved	Saved in State
Min	0.10 dB
Max	20 dB
Key Path	**AMPTD**

Scale Type

Chooses a linear or logarithmic vertical scale for the display and for remote data readout.

When Scale Type (Log) is selected, the vertical graticule divisions are scaled in logarithmic units. The top line of the graticule is the Reference Level and uses the scaling per division (Scale/Div) to assign values to the other locations on the graticule.

When Scale Type (Lin) is selected, the vertical graticule divisions are linearly scaled with the reference level value at the top of the display and zero volts at the bottom. Each vertical division of the graticule represents one-tenth of the Reference Level.

NOTE The Y Axis Unit used for each type of display is set by pressing Y Axis Unit. The analyzer remembers separate Y Axis Unit settings for both Log and Lin.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:SPACing?`
Example	DISP:WIND:TRAC:Y:SPAC LOG DISP:WIND:TRAC:Y:SPAC?
Dependencies/Couplings	If Normalize is on, Scale Type is forced to Log and is grayed out. Changing the Scale Type always sets the Y Axis unit to the last unit specified for the current amplitude scale. In other words, we restore the Y Axis unit setting appropriate per log/lin.
Preset	LOG
State Saved	Saved in State

Key Path	**AMPTD**

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:

If the selected marker is already on, the analyzer will attempt the centering at that marker's frequency

There is no preselector for signals below approximately 3.6 GHz

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. 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.

Remote Command	`[:SENSe]:POWer[:RF]:PCENter`
Example	POW:PCEN
Dependencies/Couplings	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. Active marker position determines where the centering will be attempted.
Remote Command Notes	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, and so on. Any message thrown by the keypress is also thrown in response to the remote command.

Preset	n/a (see Presel Adjust)
State Saved	n/a (see **Presel Adjust**)
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.

Remote Command	`[:SENSe]:POWer[:RF]:PADJust <freq>` `[:SENSe]:POWer[:RF]:PADJust?`
Example	POW:PADJ 100KHz POW:PADJ?
Dependencies/Couplings	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 such models, 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 Unit	Hz

Remote Command	`[:SENSe]:POWer[:RF]:PADJust:PRESelector MWAVe|MMWave|EXTernal` `[:SENSe]:POWer[:RF]:PADJust:PRESelector?`
Remote Command Notes	[:SENSe]:POWer[:RF]:PADJust:PRESelector MWAVe|MMWave|EXTernal where `MWAV` = 3–26 GHz `MMWave` = 26–50 GHz `EXTernal` = External The command form is a NOP The query, will return MWAVe for MXA.

Y Axis Unit

Displays the menu keys that enable you to change the vertical (Y) axis amplitude unit. The analyzer retains the entered Y Axis Unit separately for both Log and Lin amplitude scale types. For example, if Scale Type has been set to Log, and you set Y Axis Unit to dBm, pressing Scale Type (Log) sets the Y Axis Unit to dBm. If Scale Type has been set to Lin and you set Y Axis Unit to V, pressing Scale Type (Lin) sets the Y Axis Unit to V. Pressing Scale Type (Log) again sets the Y axis unit back to dBm.

Remote Command	`:UNIT:POWer DBM|DBMV|DBMA|V|W|A|DBUV|DBUA|DUVM|DUAM|DBPT|DBG` `:UNIT:POWer?`
Example	UNIT:POW dBmV UNIT:POW?
Dependencies/Couplings	The analyzer retains the entered Y-Axis Unit separately for both Log and Lin amplitude scale types (see key descriptions).

Remote Command Notes	The settings of Y Axis Unit and Scale Type, affect how the data is read over the remote interface. When using the remote interface no unit is returned, so you must know what the Y axis unit is to interpret the results: Example 1, set the following: Scale Type (Log) Y Axis Unit, dBm Scale/Div, 1 dB Ref Level, 10 dBm This sets the top line to 10 dBm with each vertical division representing 1 dB. Thus, if a point on trace 1 is on the fifth graticule line from the top, it represents 5 dBm and will read out remotely as 5. Example 2, set the following: Scale Type (Lin) Y Axis Unit, Volts Ref Level, 100 mV (10 mV/div) This sets the top line to 100 mV and the bottom line to 0 V, so each vertical division represents 10 mV. Thus, if a point on trace 1 is on the fifth graticule line from the top, it represents 50 mV and will read out remotely as 50.
Preset	dBm for log scale, V for linear. The true ‘preset’ value is dBm, since at preset the Y Scale type is set to logarithmic.
State Saved	Saved in State
Key Path	**AMPTD**

dBm

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBm.

Remote Command Example	UNIT:POW DBM
Key Path	**AMPTD, Y Axis Unit**

dBmV

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBmV.

Remote Command Example	UNIT:POW DBMV
Key Path	**AMPTD, Y Axis Unit**

dBmA

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBmA.

Remote Command Example	UNIT:POW DBMA
Key Path	**AMPTD, Y Axis Unit**

W

Sets the amplitude unit for the selected amplitude scale (log/lin) to watt.

Remote Command Example	UNIT:POW W
Key Path	**AMPTD, Y Axis Unit**

V

Sets the amplitude unit for the selected amplitude scale (log/lin) to volt.

Remote Command Example	UNIT:POW V
Key Path	**AMPTD, Y Axis Unit**

A

Sets the amplitude unit for the selected amplitude scale (log/lin) to Ampere.

Remote Command Example	`UNIT:POW A`
Key Path	**AMPTD, Y Axis Unit**

dBμV

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBμV.

Remote Command Example	UNIT:POW DBUV
Key Path	**AMPTD, Y Axis Unit**

dBμA

Sets the amplitude unit for the selected amplitude scale (log/lin) to dBμA.

Remote Command Example	UNIT:POW DBUA
Key Path	**AMPTD, Y Axis Unit**

Reference Level Offset

Adds an offset value to the displayed reference level. The reference level is the absolute amplitude represented by the top graticule line on the display.

Offsets are used when gain or loss occurs between a device under test and the analyzer input. Thus, the signal level measured by the analyzer may be thought of as the level at the input of an external amplitude conversion device. Entering an offset does not affect the trace position or attenuation value, just the value of the top line of the display and the values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, and so forth, are all affected by Ref Level Offset.

NOTE	Changing the offset 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 Ref Level Offset, the exported data will contain the trace data with the offset applied.

The maximum reference level available is dependent on the reference level offset. That is, Ref Level - Ref Level Offset must be in the range –170 to +30 dBm. For example, the reference level value range can be initially set to values from –170 dBm to 30 dBm with no reference level offset. If the reference level is first set to –20 dBm, then the reference level offset can be set to values of –150 to +50 dB.

If the reference level offset is first set to –30 dB, then the reference level can be set to values of –200 dBm to 0 dBm. In this case, the reference level is held at 0 dBm because the maximum limit of +30 dBm is reached with a reference level setting of 0 dBm with an offset of –30 dB. If instead, the reference level offset is first set to 30 dB, then the reference level can be set to values of –140 to +60 dBm.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet <rel_ampl>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:RLEVel:OFFSet?`
Example	DISP:WIND:TRAC:Y:RLEV:OFFS 12.7 Sets the Ref Level Offset to 12.7 dB. The only valid suffix is dB. If no suffix is sent, dB will be assumed.
Preset	0 dBm
State Saved	Saved in State
Min	The range for Ref Lvl Offset is variable. It is limited to values that keep the reference level within the range of –327.6 dB to 327.6 dB.
Max	327.6 dB
Key Path	**AMPTD**

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.

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

Preamp Band

Sets the preamplifier band.

Remote Command	`[:SENSe]:POWer[:RF]:GAIN:BAND LOW|FULL` `[:SENSe]:POWer[:RF]:GAIN:BAND?`
Dependencies/Couplings	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown.
Preset	OFF
State Saved	Saved in state.
Key Path	**AMPTD, Internal Preamp**

Off

Turns the internal preamp off.

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

Low Band

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

Remote Command 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.

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

Remote Command	`:COUPle ALL|NONE`
Remote Command 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 de-couples all the coupled instrument parameters and is not recommended for making measurements.

The Auto Couple front-panel key sets all Auto/Man parameter couplings in the measurement to Auto. This includes couplings that may be unavailable or grayed out due to the current state (for example, in the Swept SA measurement, there is no Auto/Man coupling for RBW while in Zero Span. Nonetheless if Auto Couple were pressed while in Zero Span it would set RBW to Auto in the background, so that on exit from Zero Span it would be in Auto).

Any Auto/Man selection specific to the other measurements in the mode won't be affected by Auto Couple. Any functions that are NOT coupled with other instrument parameters, such as ranging or leveling variables, such as "AutoRange" or "AutoScale", won't be affected by Auto Couple.

Pressing Auto Couple in the Swept SA measurement sets the Auto/Man coupling to Auto for the following parameters:

Center Frequency Step

Attenuation

Sweep Time

Detector

Resolution BW

Video BW

VBW/RBW Ratio

Average Type

Span/RBW Ratio

Phase Noise Optimization

ADC Dither

Sweep Type

Swept IF Gain (MXA)

FFT IF Gain

Sweep Time Rules

Sweep Type

Sweep Type Rules

FFT Width

Pressing the Auto Couple key does not affect markers, marker functions, trace or display attributes, or any other instrument setting other than those specifically mentioned above.

BW

The BW key opens the BW menu, which contains keys to control the Resolution Bandwidth and Video Bandwidth functions of the instrument.

The Res BW functions control filter bandwidth and filter type. There are three filter types: Gaussian, Flattop, and CISPR/MIL. The Gaussian filters have a response curve that is parabolic on a log scale. The Flattop filter shape is a close approximation of a rectangular filter.

NOTE	The AVERAGE functions, which appeared in the BW menu in earlier analyzers, can now be found in the Trace menu and the Meas Setup menu. In the Trace menu, you may turn Trace Averaging on or off for the desired traces (rather than globally as in the past); and in the Meas Setup menu you may configure Averaging, by setting the Average Number and the Average Type.

Key Path	**Front-panel key**

Res BW

Activates the **Res BW** active function, which allows you to manually set the resolution bandwidth (RBW) of the analyzer. Normally, **Res BW** (Auto) selects automatic coupling of the Res BW to **Span** using the ratio set by the Span:3 dB RBW key. To de-couple the resolution bandwidth, press Res BW until Man is underlined, or simply enter a different value for **Res BW**.

When the **Res BW** is manually selected, it may be returned to the coupled state by pressing the **Res BW** key until **Auto** is underlined. This may also be done by pressing Auto Couple or by performing a **Preset**.

When **Res BW** is set to **Auto**, the bandwidth selected depends on the Filter Type.

Only certain discrete resolution bandwidths are available. The available bandwidths are dependent on the **Filter Type**. If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

The zero-span case deserves some mention, because RBW is coupled to Span when in a swept (non-zero) span and in zero span there is normally no meaningful RBW coupling.

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

Example	BAND 1 KHZ BAND? BWID:AUTO ON BWID:AUTO?
Dependencies/Couplings	When in Zero Span, there is no Auto setting for Res BW. The Auto/Man line on the Res BW softkey disappears in this case, and if the SCPI command `[:SENSe]:BWID[:RESolution]:AUTO ON` is sent, it generates an error. Sweep time is coupled to RBW when in a non-zero span. If **Sweep Time** is set to Auto, then the sweep time is changed as the RBW changes, to maintain amplitude calibration. Video bandwidth (VBW) is normally coupled to RBW. If **VBW** is set to Auto, then the VBW is changed as the RBW changes, to maintain the ratio set by VBW:3 dB RBW. See the **VBW:3 dB RBW** key description. Because the above couplings depend on which traces are active, they must be re-examined whenever any trace goes active or inactive, except when this leaves no traces active. Transitioning to the state where no traces are active should not affect the couplings; in that way, the annotation will always reflect the state of the last trace which was active.
Remote Command Notes	The setting and querying of values depends on the current bandwidth type.
Preset	3 MHz ON
State Saved	Saved in Instrument State
Min	1 Hz
Max	8 MHz is the max equivalent –3 dB RBW, which means that the named RBW (the one shown on the key and so forth) can actually exceed 8 MHz if using a filter other than –3 dB Gaussian.
Key Path	**BW**
Default Unit	Hz

Video BW

Lets you change the analyzer post-detection filter (VBW) from 1 Hz to 8 MHz in approximately 10% steps. In addition, a wide-open video filter bandwidth may be chosen by selecting 50 MHz.

Normally, Video BW (Auto) selects automatic coupling of the Video BW filter to the resolution bandwidth filter using the ratio set by the VBW:3 dB RBW key. To de-couple the video bandwidth, press Video BW until Man is underlined, or enter a new value.

When the **Video BW** is manually selected, it may be returned to the coupled state by pressing the **Video BW** key until **Auto** is underlined. This may also be done by pressing Auto Couple or by performing a **Preset**.

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

Example	BAND:VID 1 KHZ BAND:VID? BWID:VID:AUTO ON BWID:VID:AUTO?
Dependencies/Couplings	In this special case the Video BW is not coupled to Res BW and is determined in a different way. When the Average Detector is selected and Sweep Type is set to **Swept, t**he video bandwidth filter cannot be used, because it uses the same hardware as the Average Detector.
Remote Command Notes	The values shown in this table reflect the conditions after a Mode Preset.
Preset	3 MHz ON
State Saved	Saved in Instrument State
Min	1 Hz
Max	50 HMz
Key Path	**BW**
Default Unit	Hz

VBW:3dB RBW

Selects the ratio between the video bandwidth and the equivalent 3 dB resolution bandwidth to be used for setting VBW when VBW is in Auto.

Normally, VBW:3dB RBW (Auto) selects automatic coupling of the VBW:3 dB RBW ratio to **Detector**. To de-couple the ratio, press VBW:3 dB RBW until Man is underlined, or enter a new value.

When the VBW:3dB RBW is manually selected, it may be returned to the coupled state by pressing the VBW:3 dB RBW key until **Auto** is underlined. This may also be done by pressing Auto Couple or by performing a **Preset**.

Remote Command	`[:SENSe]:BANDwidth|BWIDth:VIDeo:RATio <real>`
	`[:SENSe]:BANDwidth|BWIDth:VIDeo:RATio?`
	`[:SENSe]:BANDwidth|BWIDth:VIDeo:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:BANDwidth|BWIDth:VIDeo:RATio:AUTO?`

Example	BAND:VID:RAT 2 BAND:VID:RAT? BAND:VID:RAT:AUTO 0 BAND:VID:RAT:AUTO?
Dependencies/Couplings	See Coupling Auto Rules.
Remote Command Notes	The values shown in this table reflect the conditions after a Mode Preset.
Preset	1 ON
State Saved	Saved in Instrument State
Min	0.00001
Max	3000000
Key Path	**BW**

Coupling Auto Rules:

The Auto Rules for the **VBW:3dB RBW** function follow.

First, we go through the following list and find the lowest numbered detector being used on any active traces (traces for which Update is On):

Peak

Normal

Average

Sample

Negative Peak

Use that detector to pick the ratio based on the following criteria:

If the detector is **Negative Peak**, use 1.0

If the detector is **Normal**, use 1.0.

If the detector is **Average**, use 0.1.

The use of a small ratio in Average detection is desirable because of its effect on the sweep time equations. The VBW filter is not actually in-circuit when the average detector is on.

Otherwise, the detector is **Peak** or **Sample**. These two detectors can use the same rules.

In these cases:

If all active traces have Averaging on, use 0.1.

This is because when doing trace averaging, reducing the VBW reduces the variance. You may have chosen the peak detector to get very accurate averaged CW measurements, and a narrow VBW helps with that.

If any active trace is in max hold or min hold, use 10.0, because Max and Min Hold operations will usually be intended to capture peaks and pits without smoothing from the VBW filter.

If any marker function is on, choose 0.1, because Marker functions are all designed for power averaging, so we will often want a narrow VBW for better repeatability.

Otherwise, use 1.0 as a compromise; because you have not set the analyzer in a way that implies that you are measuring noise, pulsed-RF or CW signals.

Because the above couplings depend on which traces are active, they are re-examined whenever any trace goes active or inactive, except when this leaves no traces active. Transitioning to the state where no traces are active should not affect the couplings; in that way, the annotation will always reflect the state of the last trace which was active.

Span:3dB RBW

Selects the ratio between span and resolution bandwidth.

Normally, Span:3dB RBW (Auto) selects a Span:3 dB RBW ratio of 106:1. If you manually enter the ratio, Man will become underlined, which enables you to manually select ratios more suitable for certain measurements.

When the Span:3dB RBW is manually selected, it may be returned to the coupled state by pressing the Span:3dB RBW key until **Auto** is underlined. This may also be done by pressing Auto Couple or by performing a **Preset**.

Remote Command	`[:SENSe]:FREQuency:SPAN:BANDwidth[:RESolution]:RATio <integer>`
	`[:SENSe]:FREQuency:SPAN:BANDwidth[:RESolution]:RATio?`
	`[:SENSe]:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO?`
Example	FREQ:SPAN:BAND:RAT 200 sets a ratio of 200:1, and turns off the auto coupling.
	FREQ:SPAN:BAND:RAT:AUTO ON
	FREQ:SPAN:BAND:RAT?

Dependencies/Couplings	If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, the command is acted upon, but it doesn't affect the current measurement.
Remote Command Notes	The values shown in this table reflect the conditions after a Mode Preset.
Preset	106
	ON
State Saved	Saved in Instrument State
Min	2
Max	10000
Key Path	**BW**

RBW Control

Selects the type/shape for the resolution bandwidth filters. Historically, the Res BW filters in Agilent spectrum analyzers were Gaussian filters, specified using the –3 dB bandwidth of the filter. That is, a 10 MHz Res BW filter was a Gaussian shape with its –3 dB points 10 MHz apart. In this analyzer you can, using the **Filter BW** key, specify bandwidths other than the –3 dB bandwidth (–6 dB, Noise, Impulse) for the width of the Gaussian filters. Furthermore, there are certain special filter types, such as Flat Top and CISPR/MIL, that are desirable under certain measurement conditions. These available under the **Filter Type** key.

Key Path	**BW**

Filter Type

Besides the Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions. The **Filter Type** menu gives you control over these types.

Remote Command	`[:SENSe]:BANDwidth|BWIDth:SHAPe GAUSsian|FLATtop|EMI`
	`[:SENSe]:BANDwidth|BWIDth:SHAPe?`
Example	BAND:SHAP GAUS
Dependencies/Couplings	none
Preset	Auto Couple chooses the preset value
State Saved	Saved in State
Key Path	**BW, RBW Control**

Gaussian filters

MXA provides four ways of specifying the bandwidth of a Gaussian filter:

The –3 dB bandwidth of the filter

The –6 dB bandwidth of the filter

The equivalent Noise bandwidth of the filter, which is defined as the bandwidth of a rectangular filter with the same peak gain which would pass the same power for noise signals.

The equivalent Impulse bandwidth of the filter, which is defined as the bandwidth of a rectangular filter with the same peak gain which would pass the same power for impulsive (narrow pulsed) signals.

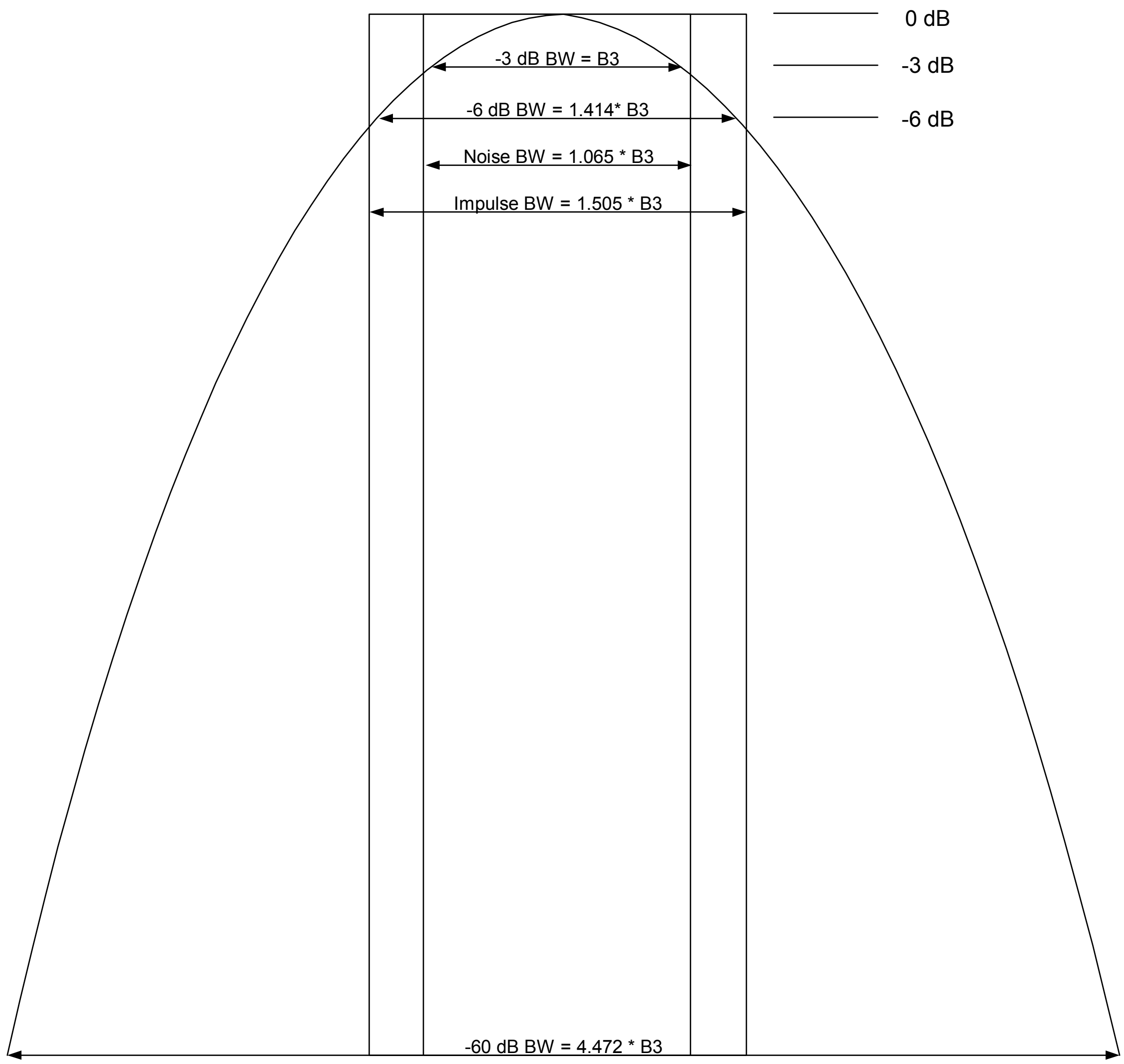
The [ ] readback on the **RBW Control** key shows the Filter Type selection, and for the Gaussian type, the Filter BW selection, as:

The annotation at the bottom of the screen shows the filter type that is used, or for the Gaussian type, the filter bandwidth type (unless it is Normal). This will be shown parenthetically between the words “Res BW” and the value, for example

Res BW 10.0 Hz (Normal bandwidth)

Res BW (Impulse) 14.8 Hz (Impulse bandwidth)

The figure below shows the relationships of the various filter bandwidths for filters with MXA’s shape factor (shape factor is defined as the ratio of the –60 dB bandwidth to the – 3 dB bandwidth):



The table below compares the above bandwidths, in terms of the –3 dB bandwidth B3, for filters with true Gaussian characteristics, as well as for the actual MXA swept filters, and for the MXA FFT (Kaiser-Bessel) filters:

	Ideal Gaussian	MXA Swept	MXA FFT
–6 dB BW	1.414*B3	1.407*B3	~1.404*B3
Noise BW	1.065*B3	1.058*B3	~1.055*B3
Impulse BW	1.505*B3	1.479*B3	n/a
Shape factor	4.472	4.1	~3.6

The **RBW Control** menu lets you choose the filter type, using the **Filter Type** menu, and for the Gaussian shape, the filter bandwidth (–3 dB, –6 dB, Noise or Impulse) that will be used when specifying the width of the filter, using the **Filter BW** menu. Note that for a given Gaussian filter, changing the filter bandwidth specification does not affect the filter width at all but only the means of specifying it. For example, the filter whose –3 dB bandwidth is 1.0 kHz is the same as the filter whose –6 dB bandwidth is 1.41 kHz, whose Noise bandwidth is 1.06 kHz, and whose Impulse bandwidth is 1.48 kHz. As you cycle through these various filter bandwidths the filter does not change, but the way the filter is annotated and the value which appears in the active function area and on the softkey does.

The actual bandwidths used to realize MXA's Gaussian filters are chosen to come as close as possible to the E24 series (24 per decade) within the limitations of Boris.

Flattop filters

When the Flattop filter type is chosen, a new set of 134 RBW hardware settings are available. These settings realize filters that are approximately rectangular in shape. When this shape is chosen the filter bandwidth options are irrelevant and therefore unavailable.

The Flat Top bandwidths that we will allow will be in the range of 3.0 Hz to 8 MHz. There are three distinct regions which comprise the set of available bandwidths. The first region uses the main list of E24 bandwidths constructed to be 3.1 MHz divided by N, where N is large enough that we can find a suitable N within the E24 series of 24 settings per decade. The maximum N is 220, giving a minimum bandwidth of 3.0 Hz. Bandwidths up through 270 kHz are part of this series, giving 120 bandwidth choices. The next series is the ten choices for small N numbers, which are 300, 330, 390, 430, 510, 620 and 750 kHz and 1.0, 1.5 and 3.0 MHz. The final four choices are the 4, 5, 6 and 8 MHz choices from the Gaussian (normal) list. The 6 MHz choice is an alignment that was specially designed for its flat top characteristic in Boris. The total number of choices are thus 120 + 10 + 4, or 134 total

The [ ] readback on the **RBW Control** key shows the Flattop filter type selection, as:

The annotation at the bottom of the screen will show that the Flattop shape is being used, for example:

Res BW (Flattop) 10 Hz

Gaussian

Selects the Gaussian filter type. There are 160 of these RBWs. They are arranged in a 24-per-decade sequence from 1 Hz through 3 MHz, plus the 4, 5, 6 and 8 MHz settings.

Example	BAND:SHAP GAUS
Remote Command Notes	Parameter is `GAUSsian`.
Key Path	**BW, RBW Control, Filter Type**

Flattop

Selects the flat top filter type.

Example	BAND:SHAP FLAT
Key Path	**BW, RBW Control, Filter Type**

Filter BW

When using the Gaussian filters for certain types of applications it can be useful to be able to specify the filter width using points other than the –3 dB points. The Filter BW function allows you to pick the filter based on its –3 dB (Normal) bandwidth, its –6 dB bandwidth, its Noise bandwidth, or its Impulse bandwidth. In all four cases the –3 dB bandwidth is the same. The filter does not change, but the way you specify it changes.

Remote Command	`[:SENSe]:BANDwidth|BWIDth:TYPE DB3|DB6|IMPulse|NOISe` `[:SENSe]:BANDwidth|BWIDth:TYPE?`
Example	BAND:TYPE NOIS
Dependencies/Couplings	Grayed out unless the Gaussian filter type is selected. Benign 0.1002 Because the above couplings depend on which traces are active, they must be re-examined whenever any trace goes active or inactive, except when this leaves no traces active. Transitioning to the state where no traces are active should not affect the couplings; in that way, the annotation will always reflect the state of the last trace which was active.
Preset	Auto Couple chooses the preset value
State Saved	Saved in State
Key Path	**BW, RBW Control**

–3 dB (Normal)

Selects the normal gaussian-shaped bandwidths that are defined by their –3 dB bandwidths.

Example	BAND:TYPE DB3
Key Path	**BW, RBW Control, Filter BW**

–6 dB

Selects the filter bandwidths where the bandwidth is defined at the –6 dB points. This uses the normal RBW filters, but the value displayed on the key, active function line and screen annotation changes to reflect the –6 dB bandwidth instead of the –3 dB bandwidth.

Example	BAND:TYPE DB6

Key Path	**BW, RBW Control, Filter BW**

Noise

Selects the noise filter bandwidths. This uses the normal RBW filters, but the value displayed on the key, active function line and screen annotation changes to reflect the equivalent noise bandwidth, instead of the –3 dB bandwidth.

Example	BAND:TYPE NOIS
Key Path	**BW, RBW Control, Filter BW**

Impulse

Selects the impulse bandwidths. This uses the normal RBW filters, but the value displayed on the key, active function line and screen annotation changes to reflect the equivalent impulse bandwidth instead of the –3 dB bandwidth.

Example	BAND:TYPE IMP
Key Path	**BW, RBW Control, Filter BW**

Frequency/Channel

Center Freq

Allows you to specify the center frequency of the spectrum analyzer.

Mode:	WiMAX OFDMA
Key Path:	**Frequency/Channel**
Remote Command:	`[:SENSe]:FREQuency:CENTer <freq>`
	`[:SENSe]:FREQuency:CENTer?`
Preset:	1.0 GHz
State Saved:	Saved in instrument state.
Min:	–79.999995 MHz
Max:	Hardware Dependent:
	Opt503 = 3.699999995 GHz
	Opt508 = 8.499999995 GHz
	Opt513 = 13.799999995 GHz
	Opt526 = 26.999999995 GHz

Input/Output

The Input/Output key opens up a menu of softkeys that allow you to 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 Mode global. But individual functions are only available in a mode if they makes sense. These will be grayed out (as opposed to not showing them at all). This is a special behavior of the Input/Output Menu, which is the only menu that is common across all applications.

Remote Command	`[:SENSe]:FEED RF|IQ|EXTMixer|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 ohms. Setting the computational input impedance to 75 ohms is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an analyzer with 50 ohm input impedance.

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

Remote Command	`[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50|75`
	`[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?`
Example	CORR:IMP 75 sets the input impedance correction to 75 ohms.
	CORR:IMP?
Preset	This is unaffected by 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.

This key is not available for MXA instruments with options 544 and 550 (44 & 50 GHz). The coupling is always DC.

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 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

This function presets to AC on a Mode Preset.

Remote Command	`:INPut:COUPling AC|DC` `:INPut:COUPling?`
Example	INP:COUP DC
Dependencies/Couplings	Not available on 44 GHz or 50 GHz analyzers (Options 544 and 550). Grayed out when External Mixer is selected
Remote Command Notes	In instruments with options 544 and 550, the SCPI query INP:COUP? Always returns a 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, that is 503, 508, 513, 526. The 4.8 GHz internal reference is only available with 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).

Remote 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 4.8 GHz 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 it switches back to the selected input – RF, Ext Mix or I/Q)
Dependencies/Couplings	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, 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, 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, and so forth, 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 a 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 the communications measurement applications, Ext Preamp will be grayed out and you would have a choice of MS or BTS.

Dependencies/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.)

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.

Remote Command	`[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>`
	`[:SENSe]:CORRection:SA[:RF]:GAIN?`
Example	CORR:SA:GAIN 10 sets the Ext Gain value to 10 dB
	CORR:SA:GAIN –10 sets the Ext Gain value to –10 dB (that is, an attenuation of 10 dB)
Dependencies/Couplings	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.

Remote Command	`[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>`
	`[:SENSe]:CORRection:MS[:RF]:GAIN?`
Example	CORR:MS:GAIN 10 sets the Ext Gain value to 10 dB
	CORR:MS:GAIN –10 sets the Ext Gain value to –10 dB (i.e. a loss of 10 dB)
Dependencies/Couplings	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.

Remote Command	`[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl>`
	`[:SENSe]:CORRection:BTS[:RF]:GAIN?`
Example	CORR:BTS:GAIN 10 sets the Ext Gain value to 10 dB
	CORR:BTS:GAIN –10 sets the Ext Gain value to –10 dB (i.e. a loss of 10 dB)
Dependencies/Couplings	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.
Key Path	**Input/Output**

Current Meas -> Capture Buffer

Pressing this key stores the raw data of one measurement in the internal memory of the instrument where it can then be used by a different measurement by pressing “Stored Data”. When raw data is stored, then the data source selection switch automatically changes to “Stored Data”. Stored raw data cannot be directly accessed. 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 via the FETch or READ commands.

Remote Command	`[:SENSe]:FEED:DATA:STORe`
Example	:SENSe:FEED:DATA:STOR stores recorded data

Remote Command Notes	This is command only, there is no query
Key Path	**Input/Output, Data Source**

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.

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.

Remote 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.

Remote Command	`[:SENSe]:ROSCillator:SOURce?`

Remote Command Notes	The query [SENSe]:ROSCillator:SOURce? returns the current switch setting. This means: 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. If it was set to SENSe and there is an external reference present, the query returns EXTernal and not SENSe. If it was set to EXTernal, then the query returns "EXTernal" 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.

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

Internal

The internal reference is used.

Remote Command 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.

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.

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.

Remote Command	`[:SENSe]:ROSCillator:EXTernal:FREQuency <freq>` `[:SENSe]:ROSCillator:EXTernal:FREQuency?`
Example	ROSC:EXT:FREQ 20 MHz sets the external reference frequency to 20 MHz, but does not select the external reference. ROSC:SOUR:TYPE EXT selects the external reference.
Preset	This is unaffected by Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	1 MHz
Max	50 MHz
Key Path	**Input/Output, Freq Ref In**
Default Unit	Hz

Output Config

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

Trig 1 Out

Selects the type of output signal that will be output from the rear panel Trig 1 Out connector.

Remote Command	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut HSWP|MEASuring|MAIN|GATE|GTRigger|OEVen|SUVideo|SPOint|SPATtern|PROGrammable|OFF` `:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut?`
Example	TRIG:OUTP HSWP
Preset	This is unaffected by Preset but is set to HSWP 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.

Remote Command	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity POSitive|NEGative` `:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity?`

Example	TRIG1:OUTP:POL POS
Preset	This is unaffected by 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 MXA, its function does not exactly match legacy 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**

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**

Trig 2 Out

See Trig 1 Out.

Off

Turns off the analog output.

Example	OUTP:ANAL:SA:OUTP OFF
Key Path	**Input/Output, Output Config, Analog Outputs**

Screen Video

Selects the analog output to be the screen video signal. That is, what you see on the screen is what you get at the output. This depends on the Log/Lin display Scale, Reference Level and dB per division.

Example	OUTP:ANAL:SA:OUTP SVID
Key Path	**Input/Output, Output Config, Analog Outputs**

Log Video (Log Envelope)

Selects the analog output to be the log of the video signal.

A “log video” signal has a slope and an offset. This output has the slope and the offset required by the analyzer to do the required analysis. That way, the rear panel output does not interfere with instrument operation. The full scale range of the output is about 192 dB. The offset is independent of the reference level and depends only on the input attenuation. Digital corrections for flatness are not be present in this output.

Example	OUTP:ANAL:SA:CHAN1:OUTP LVID
Key Path	**Input/Output, Output Config, Analog Outputs**

Envelope (AM Demod, Lin)

Selects the analog output to be the envelope signal on a linear (voltage) scale. The scaling is set so that 1 V output occurs with an instantaneous video level equal to the reference level. This gives you the ability to control the gain without having another setup control for the key. But it requires you to control the look of the display (the reference level) in order to control the analog output.

Example	OUTP:ANAL:SA:OUTP ENV
Key Path	**Input/Output, Output Config, Analog Outputs**

Span

The Span key activates the Span function and displays the menu of span functions.

Span

Changes the displayed frequency range symmetrically about the center frequency. While adjusting the Span the Center Frequency is held constant, which means that both Start Frequency and Stop Frequency will change.

Span also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is **Center Freq**.

While discussing the Span function we make the distinction between “swept spans” and “zero span”. We use the term “swept spans” to mean spans other than zero; recognizing that, because of this terminology, the user can be in what we call a “swept span” even while performing an FFT “sweep”.

While in swept spans, setting the span to 0 Hz through SCPI or the front panel numeric key pad puts the analyzer into zero span. However, using the Step keys and the knob in swept spans, the Span can only go as far down as 10 Hz and cannot be set to zero.

While in zero span, setting the Span to a non-zero value through SCPI or the Front Panel puts the analyzer in swept spans.

If the Span is set to a value greater than the maximum allowable span of the instrument, an error is generated indicating the data is out of range and was clipped to the upper limit.

Remote Command	`[:SENSe]:FREQuency:SPAN <freq>`
	`[:SENSe]:FREQuency:SPAN?`
Example	FREQ:SPAN 2GHz sets the span to 2GHz
	FREQ:SPAN 0 Hz sets the span to 0 Hz and puts the instrument in Zero Span

Dependencies/Couplings	Start, Stop, Center and Span have interdependencies. These must be strictly enforced when any of these four values is modified. The Span can be limited by Start or Stop Freq limits, if the Center Frequency is such that Start or Stop hit their limit. If the electrical attenuator is enabled, any attempt to set Span such that the Stop Frequency would be >3.6GHz results in an error. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "–221, Settings conflict" warning. Span affects RBW, sweeptime, FFT and Sweep choice (including FFT Width, Phase Noise Optimization and ADC Dither auto couplings.) When operating in "swept span": • Any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range • When using the knob or the step up/down keys or the UP |DOWN keywords in SCPI, the value that is being changed, for example, the Center Frequency or Span, is limited so that the other parameter is not forced to a new value The Span cannot be set to Zero by setting Start Frequency = Stop Frequency. The value of the last setting will be changed to maintain a minimum value of 10 Hz for the difference between start and stop frequencies.
Remote Command Notes	Preset and Max values depend on the Hardware Options (503, 508, 513, 526)
Preset	SA Mode: Option 503: 3.59 GHz Option 508: 8.39 GHz Option 513: 13.59 GHz Option 526: 26.49 GHz
Preset	Depends on instrument maximum frequency
State Saved	Saved in State.
Min	10 Hz unless entered directly, then 0 Hz is allowed, but nothing between 0 and 10 is ever allowed.

Max	Option 503: 3.6 GHz Option 508: 8.4 GHz Option 513: 13.6 GHz Option 526: 26.5 GHz If the knob or step keys are being used, depends on the value of the other three interdependent parameters.
Key Path	**Span X Scale**
Default Unit	Hz
SCPI Status Bits/OPC Dependencies	Overlapped if Signal Track is on (OPC shouldn't return or clear until the zooming has completed for the new span)

Full Span

Changes the frequency span of the analyzer to the Preset frequency span of the analyzer and sets the Frequency entry mode to Center/Span.

The span is dependent on the currently selected Input (see Input/Output section).

Pressing this key while in zero span puts the analyzer back in swept span.

Remote Command	`[:SENSe]:FREQuency:SPAN:FULL`
Example	FREQ:SPAN:FULL sets the span to full frequency range of the analyzer
Dependencies/Couplings	Turns off signal tracking (span zoom). It does NOT turn off the markers, nor the current active function.
Key Path	**Span X Scale**

Zero Span

Changes the displayed frequency span to 0 Hz. The horizontal axis changes to time rather than frequency. The amplitude displayed is the input signal level at the current center frequency. This is a time-domain operation mode that changes several measurement functions/couplings. The instrument behavior is similar to an oscilloscope with a frequency selective detector installed in front of the oscilloscope.

Press the Zero Span key in Span

Set Span=0 Hz

Press last Span if the last span was 0

Start the Alternate Sweep measurement in a view that includes zero span.

You cannot go to Zero Span by setting start freq = stop freq, or rolling span down with the knob, that will limit you to 10 Hz

You can go back to Swept Span by setting Span to a nonzero value or pressing Last Span, assuming the last span was not also zero span.

Pressing Zero Span places the analyzer in Center/Span frequency entry mode.

The following table summarizes the differences between Zero Span and Swept Spans:

Zero Span	Swept SA.
X axis is time	X axis is frequency.
There is no auto-RBW selection.	RBW coupled to Span when RBW in auto.
There is no auto sweep time	Sweep time coupled to RBW when sweep time in auto.
Interval Power calculated in Mkr Function	Band Power calculated in Mkr Function.
Can only define time limits when in zero span	Can only define frequency limits when in swept SA.
Marker Count counts at the center frequency	Marker Count counts at the marker frequency.
CF Step Size set to RBW value	CF Step auto-couples to 10% of Span.
Some “Marker ->” commands not available.	Other “Marker ->” commands not available.
Freq entry mode always Center/Span	Freq entry mode can be Center/Span or Start/Stop.
N dB points reports a time difference.	N dB points reports a frequency difference.

Example	FREQ:SPAN 0 Hz sets the span to zero, switches to Zero Span. Sending FREQ:SPAN 1 MHz while in Zero Span, switches to Swept span.
Dependencies/Couplings	Zero Span key is unavailable (grayed out) if the following is true: Frequency scale type is LOG (for example, Log Sweep is On). Pressing Zero Span key (switching to Zero Span): Turns off signal track function (span zoom). Turns off the auto-coupling of RBW and sweep time.
Remote Command Notes	Setting the Span to 0 Hz will change to Zero Span and setting the span to a non-zero value will select a swept span.
Key Path	**Span X Scale**

Last Span

Changes the displayed frequency span to the previous span setting. If it is pressed immediately after Signal Track is turned off, then the span setting returns to the span that was in effect before Signal Track was turned on.

If this key is pressed while in a nonzero span, and the previous value of span was 0, it will put the analyzer back in Zero Span. And if it is pressed while in zero span, it will set the analyzer back to its last nonzero span.

Pressing Last Span places the analyzer in Center/Span frequency entry mode.

Remote Command	`[:SENSe]:FREQuency:SPAN:PREVious`
Example	FREQ:SPAN:PREV sets the span to the previous value
Key Path	**Span X Scale**

Zone On/Off

Turning Zone ON will put the analyzer in the dual domain “Zone Span” view. If you are in Zone Span, turning Zone Off will put the analyzer in Swept or Zero Span depending on whether the bottom window is Swept or Zero Span.

In Zone Span the top window will display the trace with two vertical lines (Zone Markers) displayed at center frequency plus and minus 5% of the current span. (You can change the default zone frequency and zone span values using the Zone Center and Zone Span keys.) The top window will be inactive.

The bottom window will display the section of the trace in the top window that is between the Zone Markers. The span of the bottom window is 10% of the span of the top window. (You can change the default zone frequency and zone span values using the Zone Center and Zone Span keys.) When first activated, both windows have the same center frequency. The bottom window is active and the sweep time, resolution bandwidth, and video bandwidth have been coupled to the bottom window span.

There are separate annotations for frequency, res bandwidth, video bandwidth, sweep time, reference level, amplitude scale and scale/div for each window. The values for these parameters can be changed for each window independently.

To activate the top window, press the Next Window key located below the display. The active window is distinguished by a green border. Only the active window will have a sweep taken and updated to the display. When the active window is toggled, the state for the active window is saved, and the last state of the inactive window is recalled. When the window becomes inactive, its data invalid indicator will appear on the display. The data invalid indicator will remain until the window becomes the active window and a complete sweep has been executed.

Pressing Zoom will change to a one-window display showing only the active window. Pressing Zoom again will return you to the two-window display. (Pressing Zoom will set Zone (On), if it is off.)

Pressing Zone (Off) will return you to a one-window display of the active window.

Preset	Off
State Saved	Saved in State
Key Path	**Span X Scale, Zone**

Zone Center

Allows you to change the frequency of the zone markers without changing the zone span. The zone markers are vertical lines marking the zone in the upper window. They determine the frequency range displayed in the lower window. As the zone markers in the upper window are moved, the center frequency of the lower window is changed but the lower window will not be updated to reflect the change unless it is selected as the active window. (See Zone On Off.) The center frequency for the lower window is not limited by the selected start and stop frequencies in the upper window. However, if the frequency span of the lower window is outside of the span for the upper window, the vertical span markers will be displayed at the edge of the graticule. When the lower window is active, the FREQ Channel key will allow you to change Zone Center. Any change to the lower window while it is active will change the center frequency.

Unless Zone is on, only the Zone On/Off key is available and the rest of the Zone menu is grayed out.

Dependencies/Couplings	Unavailable (grayed out) when segmented sweep is on. Center Frequency of lower window changes so that it is always the same as Zone Center, and vice-versa.
Remote Command Notes	Min and Max values depend on the Hardware Options (503, 508, 513, 526)
Preset	1.5 GHz
State Saved	Saved in State
Min	Zone Center cannot go so low as to force Zone Left to be <0
Max	Zone Center can not go so high as to force Zone Right above the max freq of the instrument
Key Path	**Span X Scale, Zone**
Default Unit	Hz
SCPI Status Bits/OPC Dependencies	non-overlapped

Zone Span

Allows the span of the zone markers to be changed without changing the center frequency. The zone markers are vertical lines marking the zone in the upper window. They determine the frequency range displayed in the lower window. As the zone markers are moved, the span of the lower window is changed but the lower window will not be updated to reflect the change unless it is selected as the active window. (See Zone On Off.) The span limit of the lower window is the same as the span limit of the analyzer. The span for the lower window is not limited to the selected span of the upper window. However, if the frequency span of the lower window is outside of the span of the upper window, the vertical span markers will not be displayed. When the lower window is active, the SPAN X Scale key will change Zone Span, and any change to Zone Span while the lower window is active, will change the span.

Unless Zone is on, only the Zone On/Off key is available and the rest of the Zone menu is grayed out.

Dependencies/Couplings	Unavailable (grayed out) when segmented sweep is on. Span of lower window changes so that it is always the same as Zone Span, and vice-versa
Remote Command Notes	Min and Max values depend on the Hardware Options (503, 508, 513, 526)
Preset	2 GHz
State Saved	Saved in State
Min	Zone Span cannot go so low as to force Zone Left to be <0
Max	Zone Span can not go so high as to force Zone Right above the max freq of the instrument
Key Path	**Span X Scale, Zone**
Default Unit	Hz
SCPI Status Bits/OPC Dependencies	non-overlapped
SCPI Status Bits/OPC Dependencies	Overlapped if Signal Track is on (OPC shouldn't return or clear until the zooming has completed for the new span)

Zone Pk Right

Finds the next peak to the right of the zone center frequency on the upper window trace and then moves the zone so that it is centered around the new peak. The zone span is not changed. The center frequency of the lower window changes to reflect the new zone center frequency. The lower window will not be updated until it is made active. If no peak is found, the zone will not be moved. A signal must obey the parameters defined in Search, Search Param to be identified as a peak signal. Pressing Zone Pk Right will have no effect if the upper window is not the active window or if it is in zero span.

Unless Zone is on, only the Zone On/Off key is available and the rest of the Zone menu is grayed out.

Remote Command	`:CALCulate:ZONE:MAXimum:RIGHt`
Example	CALC:ZONE:MAX:RIGH

State Saved	Not part of saved state
Key Path	**Span X Scale, Zone**

Zone Pk Left

Finds the next peak to the left of the zone center frequency on the upper window trace and then moves the zone so that it is centered around the new peak. The zone span is not changed. The center frequency of the lower window changes to reflect the new zone center frequency. The lower window will not be updated until it is made active. If no peak is found, the zone will not be moved. A signal must obey the parameters defined in Search, Search Param to be identified as a peak signal. Pressing Zone Pk Left will have no effect if the upper window is not the active window or if it is in zero span.

Unless Zone is on, only the Zone On/Off key is available and the rest of the Zone menu is grayed out.

Remote Command	`:CALCulate:ZONE:MAXimum:LEFT`
Example	CALC:ZONE:MAX:LEFT
State Saved	Not part of saved state
Key Path	**Span X Scale, Zone**

Signal Track (Span Zoom)

When Marker 1 is placed on a signal and Signal Track is pressed, the marker remains on the signal while the analyzer retunes the center frequency to the marker frequency. The analyzer keeps the signal at the center of the display, as long as the amplitude of the signal does not change by more than +/–3 dB from one sweep to another. If Marker 1 is not in Normal or Delta, turning on Signal Track sets it to Normal, performs a peak search, and centers the marker on the display.

Remote Command	`:CALCulate:MARKer:TRCKing[:STATe] OFF|ON|0|1`
	`:CALCulate:MARKer:TRCKing[:STATe]?`
Example	CALC:MARK:TRCK ON turns on Signal Track using Marker 1.
	CALC:MARK:TRCK?.

Dependencies/Couplings	Signal Track is associated with Marker 1. When marker 1 is turned off or set to Fixed, signal track is turned off as well. Signal Track is not available (grayed out) when any of the following is true: Signal ID = on, Frequency scale type = Log Signal Track and Continuous Pk cannot be used with each other. If one is on, the other is grayed out. Signal Track is grayed out if in Zero Span. But if Zero Span is entered while in Signal Track, Signal Track is turned off. Signal Track can only function properly if the trace Marker 1 is on and is updating. Therefore if Signal Track is on and the trace Marker 1 is on and is put into View, Signal Track is turned off and the Signal Track key grayed out. Whenever the trace Marker 1 is on and is not updating, the Signal Track key is grayed out. Signal Track is only available in the SA measurement. It should be grayed out in other Measurements. Signal Track can only function properly if the trace Marker 1 is on, is in Trace Update = Active. Therefore if the trace Marker 1 is on and is in Update Off mode when Signal Track is turned on, it is changed to Update On. If the trace Marker 1 is on is set to Update Off while Signal Track is on, it turns off Signal Track.
Preset	OFF
State Saved	Saved in State
Key Path	**FREQUENCY, Signal Track**
SCPI Status Bits/OPC Dependencies	Overlapped until target span is achieved. The Measuring bit remains set until all signal track actions are complete (any re-acquisition or zooming required).

If marker 1 is off when Signal Track is turned on, marker 1 is turned on in the center of the screen and a peak search is performed. If marker 1 is already on, it stays on and is used where it is. If it is Fixed, it is set to Normal.

If you move the marker during Signal Track, a Mkr-> CF is performed and the signal track function starts over.

If the signal is lost, an attempt will be made to find it again and continue tracking. If there are other signals on the screen that are near the same amplitude, one of them may be found instead since the algorithm is seeking a signal with amplitude similar to the amplitude of the original signal.

Signals near 0 Hz cannot be tracked effectively as they cannot be distinguished from the LO feed-through, which is excluded by intent from the search algorithm.

As a speed optimization, the center frequency is only changed if it differs from the marker position by 1% or more of the span.

If the analyzer is in Single Sweep and Signal Track is turned on, then nothing happens until a sweep is actually initiated (for example,. by an INIT:IMM or Single keypress, and a trigger). Once the sweep is initiated, the entire set of sweeps necessary to complete a pass through the signal track algorithm ensues before the box returns *OPC true, returns results to a READ or MEASure, or returns to the idle state.

If the span is changed while in Signal Track, either by you or because moving the instrument to the signal's frequency results in Span Limiting, an "auto-zoom" algorithm is executed to get to the new span without losing the signal. In "auto zoom", the span is reduced in stages, with a sweep between each stage. You will see this zooming occur as each sweep is performed, and the new span is set. This has in the past been referred to as "auto zoom" and in MXA, an informational message that says "Auto Zoom" will be displayed while this is happening and removed when it completes.

When auto-zooming, the set of steps necessary to achieve the target span is to be considered a "measurement," thus the entire process executes even if the analyzer is in single sweep. *OPC will not return true until the process is complete nor will results be returned to a READ or MEASure command. If the analyzer is in a measurement such as averaging when this happens, the act of changing the span restarts averaging but the first average trace is the last trace of the auto zoom.

When you increase the span, we go directly to the new span. No zooming is required.

This function is intended to track signals with a frequency that is changing (drifting), and an amplitude that is not changing. It keeps tracking if you are in continuous-sweep mode. If in single-sweep mode, as described above, the analyzer only does one center frequency adjustment as necessary.

Trace/Detector

The **Trace/Detector** menu lets you control the acquisition, display, storage, detection and manipulation of trace data for the six available traces. The first page of this menu contains a selection of the trace type (**Clear Write, Trace Average, Max Hold, Min Hold**) for the selected trace. Those choices are described here. A trace is a series of data points, each having an x and a y value. The x value is usually frequency (or time) and the y value is amplitude. Each data point is referred to as a trace point. In any given trace, trace point 0 is the first point, and trace point (sweep_points – 1) is the last. For example, in a 1001 point trace, the first point is 0 and the last is 1000. Another term sometimes used to describe traces is bucket. A bucket is the frequency span before and after the trace point equal to the point spacing. The y value is measured across (during) this bucket.

Remote Command	`:TRACe[1]|2|3|4|5|6:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe[1]|2|3|4|5|6:TYPE?`
Dependencies/Couplings	Sending a trace command does not cause the specified trace to become selected. Selecting a trace type (pressing any of the four keys or sending a `TRAC:TYPE` command) **Update** is set to **On** and **Display** is set to **On**, even if that trace type was already selected.
Remote Command Notes	`WRITe` = Clear Write `AVERage` = Trace Average `MAXHold` = Maximum Hold `MINHold` = Minimum Hold
Preset	Write. During normal operation of the instrument (that is, other than at power-up), after a mode preset is performed, all active traces are cleared. This is so their domains and initial x values will match the current X Axis of the analyzer. Inactive traces are not cleared after a preset, so a trace which is in **Update=On** before a preset, and in **Update=Off** after the preset, will still have the data that it had before the preset.
State Saved	The type of each trace is saved in Instrument State
Key Path	**Front-panel key**

Select Trace

Determines which trace the type control keys will affect. Press **Trace** until the number of the desired trace is underlined.

Preset	Trace 1

State Saved	The number of the selected trace is saved in Instrument State
Key Path	**Trace/Detector**

Clear Write

In **Clear Write** type each trace update replaces the old data in the trace with new data. Pressing the **Clear Write** key for the selected trace, or sending the `:TRAC:TYPE WRIT` command for the specified trace, sets the trace type to **Clear Write** and causes the trace to be cleared. Then a new sweep is initiated.

Because pressing **Clear Write** stops the current sweep and initiates a new one, **Trace Average, Max Hold** and **Min Hold** data may be interrupted in mid-sweep, and may not accurately reflect the displayed count. Therefore, when **Clear Write** is pressed for one trace, **Trace Average, Max Hold** and **Min Hold** must restart for all traces.

When in **Clear Write**, if a measurement-related instrument setting is changed, a new sweep is initiated but the trace is not cleared.

Example	TRAC:TYPE WRIT TRAC3:TYPE AVER
Dependencies/Couplings	Whenever you press **Clear Write** or send the equivalent SCPI command, **Update** is set to **On** and **Display** is set to **On**. Automatic detector selection and the VBW:RBW ratio auto rules both depend on the trace type selections
Remote Command Notes	See **Trace/Detector**
Preset	After a Preset, any trace that is in **Clear Write** is cleared (all trace points set to mintracevalue).
State Saved	The type for each trace is saved in Instrument State
Key Path	**Trace/Detector**

Trace Average

In **Trace Average** type the analyzer maintains and displays an average trace, which represents the cumulative average on a point-by-point basis of the new trace data and previous averaged trace data. Details of the averaging calculations may be found under **Average/Hold Count** and **Average Type** in the Meas Setup Section.

Pressing the **Trace Average** key (for the selected trace), or sending the `:TRAC:TYPE AVER` command (for the specified trace), sets the trace type to **Trace Average** and causes the average to be restarted.

When in **Trace Average**, if a measurement-related instrument setting is changed, the average restarts and a new sweep is initiated but the trace is not cleared.

Restarting the average means:

The average/hold count k is set to 1, so that the next time the average trace is displayed it represents one trace of new data

A new sweep is initiated.

Once the new sweep starts, the trace is overwritten with current trace data as the first trace of the new average

Remember that restarting averaging also restarts **Max Hold** and **Min Hold**, as there is only one count for Trace Average and Hold.

Example	TRAC:TYPE TRACE2,AVER
Dependencies/Couplings	Affected by **Average Type** and **Average/Hold Count** Whenever you press **Trace Average** or send the equivalent SCPI command, **Update** is set to **On** and **Display** is set to **On**. Automatic detector selection and the VBW:RBW ratio auto rules both depend on the trace type selections..
Remote Command Notes	See **Trace/Detector**
Preset	After a Preset, any trace that is in Trace Average is cleared (all trace points set to mintracevalue).
State Saved	The type for each trace is saved in Instrument State
Key Path	**Trace/Detector**

Max Hold

In **Max Hold** type the analyzer maintains and displays a max hold trace, which represents the maximum data value on a point-by-point basis of the new trace data and previous trace data.

Pressing the **Max Hold** key for the selected trace, or sending the `:TRAC:TYPE MAXH` command for the specified trace, sets the trace type to **Max Hold,** causes the trace to be cleared, and causes the **Max Hold** sequence to be restarted.

When in **Max Hold**, if a measurement-related instrument setting is changed, the **Max Hold** sequence restarts and a new sweep is initiated but the trace is not cleared.

Restarting the **Max Hold** sequence means:

The average/hold count k is set to 1, so that the next time the max hold trace is displayed it simply represents one trace of new data.

A new sweep is initiated.

Remember that restarting **Max Hold** also restarts averaging and **Min Hold**, as there is only one count for Trace Average and Hold.

Example	TRAC:4TYPE MAXH

Dependencies/Couplings	Affected by **Average Type** and **Average/Hold Count**
	Whenever you press **Max Hold** or send the equivalent SCPI command, **Update** is set to **On** and **Display** is set to **On**.
	Automatic detector selection and the VBW:RBW ratio auto rules both depend on the trace type selections.
Remote Command Notes	See **Trace/Detector**
Preset	After a Preset, any trace that is in **Max Hold** is cleared (all trace points set to mintracevalue).
State Saved	The type for each trace is saved in Instrument State
Key Path	**Trace/Detector**

Min Hold

In **Min Hold** type the analyzer maintains and displays a min hold trace, which represents the minimum data value on a point-point basis of the new trace data and previous trace data. Details of the count limiting behavior may be found under **Average/Hold Count** in the Meas Setup Section**.**

Pressing the **Min Hold** key for the selected trace, or sending the `:TRAC:TYPE MINH` command for the specified trace, sets the trace type to **Min Hold,** causes the trace to be cleared, and causes the **Min Hold** sequence to be restarted.

When in **Min Hold**, if a measurement-related instrument setting is changed, the **Min Hold** sequence restarts and a new sweep is initiated but the trace is not cleared.

Restarting the **Min Hold** sequence means:

The average/hold count k is set to 1, so that the next time the min hold trace is displayed it simply represents one trace of new data.

A new sweep is initiated.

Remember that restarting **Min Hold** also restarts **Max Hold** and averaging, as there is only one count for Trace Average and Hold.

Example	TRAC3:TYPE MINH
Dependencies/Couplings	Affected by **Average Type** and **Average/Hold Count.**
	Whenever you press **Min Hold** or send the equivalent SCPI command, **Update** is set to **On** and **Display** is set to **On**.
	Automatic detector selection and the VBW:RBW ratio auto rules both depend on the trace type selections.
Remote Command Notes	See **Trace/Detector**
Preset	After a Preset, any trace that is in **Min Hold** is cleared (all trace points set to maxtracevalue).
State Saved	The type for each trace is saved in Instrument State

Key Path	**Trace/Detector**

View/Blank

This key lets you set the state of the two trace variables, Update and Display. The four choices available in this 1-of-N menu are:

Trace On: Update and Display both On

View: Update Off and Display On

Blank: Update Off and Display Off

Background: Update On, Display Off (this allows a trace to be blanked and continue to update "in the background".)

When a trace becomes inactive, the following things happen:

Any update from the SENSe system (detectors) immediately stops (does not wait for end of sweep)

The trace is displayed at half intensity (as long as it stays inactive)

Inactive traces display across the entire X Axis of the instrument. Their horizontal placement does not change even if X Axis settings subsequently are changed, although Y-axis settings will affect the vertical placement of data.

In most cases, inactive traces are static and unchanging; however, there are cases when an inactive trace will update, specifically:

if data is written to that trace from remote

if trace data is loaded from mass storage

if the trace is the target of a Copy or participant in an Exchange

if the trace is cleared using the Clear Trace function (below)

When a trace becomes active (Update=On), the trace is cleared, the average count is reset, and a new sweep is initiated.

Traces which are blanked (Display=off) do not display nor appear on printouts but are otherwise unaffected. They may be queried and markers may be placed on them.

The action of putting a trace in Display=Off and/or Update=Off does not restart the sweep and does not restart Averaging or Hold functions for any traces.

Whenever you set **Update** to **On** for any trace**, Display** is set to **On** for that trace.

Key Path	**Trace/Detector**
Remote Command	`:TRACe[1]|2|3|4|5|6:UPDate[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3|4|5|6:UPDate[:STATe]?`

Example	TRAC2:UPD 0 Makes trace 2 inactive (stops updating)
Dependencies/Couplings	Setting the trace type (even to the type it was already in) puts the trace in **Active.** Loading a trace from a file makes that trace inactive regardless of the state it was in when it was saved; as does being the target of a **Copy** or a participant in an **Exchange**. Whenever you set **Update** to **On** for any trace, the **Display** is set to **On** for that trace.
Preset	1|0|0|0|0|0 **(On** for Trace 1; **Off** for 2–6)
State Saved	Saved in Instrument State
Key Path	**Trace/Detector**

Remote Command	`:TRACe[1]|2|3|4|5|6:DISPlay[:STATe] ON|OFF|0|1` `:TRACe[1]|2|3|4|5|6:DISPlay[:STATe]?`
Example	TRAC2:DISP,1 Makes trace 2 visible TRAC3:DISP,0 Blanks trace 3
Dependencies/Couplings	Setting the trace type (even to the type it was already in) puts the trace in **Display On.** Whenever you set **Update** to **On** for any trace, the **Display** is set to **On** for that trace. Loading a trace from a file puts that trace in **Display On** regardless of the state it was in when it was saved; as does being the target of a **Copy** or a participant in an **Exchange**.
Preset	1|0|0|0|0|0 **(On** for Trace 1; **Off** for 2–6)
State Saved	Saved in Instrument State
Key Path	**Trace/Detector**

Detector

Selects a detector. The detector selected is then applied to the selected trace.

For the SCPI UI, two commands are provided. One is a legacy command, which affects all traces. There is also a new command, which uses a subopcode to specify to which trace the specified detector is to be applied to.

Remote Command	`[:SENSe]:DETector:TRACe[1]|2|3|4|5|6 AVERage|NEGative|NORMal|POSitive|SAMPle|QPEak|EAVerage|EPOSitive|MPOSitive` `[:SENSe]:DETector:TRACe[1]|2|3|4|5|6?`

Example

DET:TRAC AVER Sets trace 1's detector to average

DET:TRAC1 AVER Sets trace 1's detector to average

DET:TRAC2 SAMP Sets trace 2's detector to sample

Dependencies/Couplings

If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "–221, Settings conflict" warning.

Remote Command Notes

The query returns a name that corresponds to the detector type as shown below, and indicates the setting for Trace 1.

String Returned

Definition

NORM

Normal

AVER

Average / RMS

POS

Positive peak

SAMP

Sample

NEG

Negative peak

Preset

Preset returns all traces to "auto", which will result in Normal (Rosenfell) detection for preset conditions.

State Saved

Saved in State

Key Path

Trace/Detector, Detector

Remote Command

`[:SENSe]:DETector[:FUNCtion] NORMal|AVERage|POSitive|SAMPle|NEGative|QPEak|EAVerage|EPOSitive|MPOSitive|RMS`

`[:SENSe]:DETector[:FUNCtion]?`

Example	DET AVER Sets detector to average for all traces DET:FUNC? Returns trace 1's detector setting
Remote Command Notes	The query returns a name that corresponds to the detector type as shown below, and indicates the setting for Trace 1. The RMS selection sets the detector type to AVERage and the Average Type to RMS. Therefore if RMS has been selected, the query will return the "AVER" string. String Returned Definition NORM Normal AVER Average / RMS POS Positive peak SAMP Sample NEG Negative peak
Preset	NORMal
State Saved	Saved in State

Auto

This sets the detector for the currently selected trace to Auto. (For SCPI, the trace number is specified as a subopcode.) This will immediately apply the auto rules to determine a new detector value.

Remote Command	`[:SENSe]:DETector:TRACe[1]|2|3|4|5|6:AUTO ON	OFF	1	0` `[:SENSe]:DETector:TRACe[1]|2|3|4|5|6:AUTO?`
Example	DET:TRACE2:AUTO ON sets trace 2 detection to automatic.

Dependencies/Couplings	The auto detector rules depend upon marker type, averaging state and type, trace state writing mode, and trace active state.
Preset	Auto (On) for all detectors.
State Saved	Saved in state

Remote Command	`[:SENSe]:DETector:AUTO ON | OFF | 1 | 0` `[:SENSe]:DETector:AUTO?`
Example	DET:AUTO ON
Remote Command Notes	The query returns the Auto state of Trace 1.

Normal

This sets the detector for the currently selected trace to Normal (Rosenfell).

When the signal is CW-like, it displays the peak-detected level in the interval (bucket) being displayed. If the signal is noise-like (within a bucket the signal both rose and fell), it alternates displaying the max/min values. That is, an even bucket shows the peak (maximum) within a two-bucket wide interval centered on the even bucket. And an odd bucket will show the negative peak (minimum) within a two-bucket wide interval. For example, for an even bucket the two-bucket wide interval is a combination of one-half bucket to the left of the even bucket, the even bucket itself, and one-half bucket to the right of the even bucket, so the peak found will be displayed in the correct relative location on screen. The odd buckets are similar.

Example	DET:TRAC3 NORM sets the detector to normal for the trace 3.
Dependencies/Couplings	Selecting any detector (even the currently selected detector) for a given trace turns Update and Display on for that trace. Selecting a specific detector type turns the “” to false for this trace (manual). Selecting a detector for a trace (pressing the key or sending a [:SENS]:DET:TRAC command) puts **Update On** and **Display On** for that trace, even if that detector was already selected. Note that the legacy command [:SENS]:DET[:FUNC] does NOT exhibit this behavior. Normal detector is grayed out when the X scale is Log.

Detector Presets

These keys provide a quick way of setting a number of traces to convenient common detector settings. It is important to point out that these are not toggles or ‘modes’, and do not keep any detectors in a particular configuration. The effect is identical to just setting the traces’ detectors individually. These are simply one-time settings that are quicker than making many individual changes.

Preset	No interaction with preset
State Saved	Not saved in state

All Traces Auto

This is designed to quickly return the selected set of detectors to the “preset” state, which is auto-selected.

Dependencies/Couplings	Sets all traces’ Detector Auto to true.

Peak / Average / NPeak

This is a setting for making a measurement of the average power and the signal envelope.

Dependencies/Couplings	Trace 1: Set to peak detection, and Clear-Write. Trace 2: Set to average detection, and Clear-Write. Trace 3: Set to negative peak detection, and Clear-Write.

Peak / Sample / NPeak

This is a setting for making a measurement that displays a power sample and the signal envelope.

Dependencies/Couplings	Trace 1: Set to peak detection, and Clear-Write. Trace 2: Set to sample detection, and Clear-Write. Trace 3: Set to negative peak detection, and Clear-Write.

Clear Trace

Clears the selected trace (from the front panel) or the specified trace (from SCPI). Does not affect the state of any function or variable in the instrument. Loads mintracevalue into all of the points in the selected trace, unless the trace is in Min Hold in which case it loads maxtracevalue. It does this even if Update=Off.

Remote Command	`:TRACe:CLEar TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6`
Example	TRAC:CLE TRACE1 clears trace 1
Key Path	**Trace/Detector**

Clear All Traces

Clears all traces. Does not affect the state of any function or variable in the instrument. Loads mintracevalue into all of the points of all traces, except traces in Min Hold in which case it loads maxtracevalue. Does so even if Update=Off.

Remote Command	`:TRACe:CLEar:ALL`
Example	TRAC:CLE:ALL clears all traces
Key Path	**Trace/Detector**

Math

This menu lets you turn on trace math functions. Trace math functions perform mathematical operations between traces and, in some cases, user-specified offsets. When in a trace math function, the indicated function is performed during the sweep with the math function used in place of a detector. The trace operands for the math function are set using the **Trace Operands** key.

Remote Command	`:CALCulate:MATH TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6, PDIFference|PSUM|LOFFset|LDIFference|OFF, TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6, TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6, <real>,<real>` `:CALCulate:MATH? TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6`
Dependencies/Couplings	Trace Math is not available if **Normalize** is on. None of the trace operands can be the destination trace. If any of the three trace math commands is sent with a destination trace number matching one of the operands a warning is generated and the function does not turn on. Whenever a math function is turned on for a trace, that trace is set to Display=On and Update=On.

Remote Command Notes	The Trace Math Function command has 6 main set of parameters: - Set 1 defines the "result trace": TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6 -Set 2 defines the "function": PDIFference|PSUM|LOFFset|LDIFference|OFF - Set 3 is a "trace operand" (1): TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6 - Set 4 is a "trace operand" (2): TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6 - Set 5 defines the "Log Offset" (in dB). - Set 6 defines the "Log Difference Reference" (in dBm). The trace math mode is an enumeration; that is, when a math function is set for a trace it turns off any math function that is on for that trace and sets the new math function. The parameters sent in the command are reflected in the values in the softkey menu. There is no default for any parameter; all 6 parameters must be sent to satisfy the parser. Failure to specify a parameter will result in a missing parameter error. For some of the math modes some of the parameters are not relevant. For those modes, the parameters are ignored, and sending ",," is sufficient for those parameters. The query returns the math mode, the operand traces, the offset and the reference for the specified trace, all separated by commas. The return value of irrelevant parameters is undefined; empty fields (",,") would be desirable.
Preset	OFF,TRACE5,TRACE6,0,0 | OFF,TRACE6,TRACE1,0,0 | OFF,TRACE1,TRACE2,0,0 | OFF,TRACE2,TRACE3,0,0 | OFF,TRACE3,TRACE4,0,0 | OFF,TRACE4,TRACE5,0,0
State Saved	The trace math function for each trace is saved in Instrument State.
Key Path	**Trace/Detector**
SCPI Status Bits/OPC Dependencies	*OPC can be used to detect the completion of a sweep, which will also correspond to the completion of the math operation, since all math takes place during the sweep

Certain events can affect the trace in ways that affects all points. This can happen in any number of ways, including:

A trace clear taking place

A trace being loaded from the file system

Trace data being sent in from the remote interface

A copy or exchange of trace data

You should try to avoid these occurrences during a sweep, as they will tend to invalidate the math result being accumulated.

Whenever a trace math function is turned on, or the parameters and/or operands of an existing trace math function are changed, the destination trace is cleared. After the trace is cleared, all x-axis values in the trace, and the domain of the trace, are set to match the X Axis settings of the first trace operand. When this is complete, a new sweep is initiated.

How trace math is processed:

For each active trace, the current trace point is processed for Trace 1, then Trace 2, then Trace 3, and so forth. Trace data is taken from either the detector for that trace, or from the mathematical result of up to two other traces and an offset, depending on whether trace math is on or not. The resultant data is then fed to the Average/Hold processing block, where (if the trace type is Average, Max Hold, or Min Hold) it is processed with previous trace data. The new trace data resulting from this process is then available for display, storage or remote output.

When the processing is complete for Trace 1, Trace 2 is processed, and so on until all six traces have been processed. This allows a downstream trace to use as one of its math components a fully processed upstream trace. In other words, if math is on for Trace 4, and its operand traces are Trace 2 and Trace 3, all detector, math, average and hold processing for traces 2 and 3 is complete before the math is performed for trace 4. When the current trace point is completed for all traces, the analyzer moves on to the next trace point.

Power Diff (Op1-Op2)

Calculates a power difference between the **First Trace** operand and the **Second Trace** operand and puts the result in the destination trace.

During the sweep, the following formula is executed for each point in the trace operands, and the corresponding point is generated for the destination trace:

DestinationTrace = 10 log(10(1/10)(FirstTrace) – 10(1/10)(SecondTrace))

The values of the trace points are assumed to be in a decibel scale, as they are internally stored.

If a point in FirstTrace is equal to maxtracevalue, the resultant point is also maxtracevalue.

Otherwise, if the result of the subtraction is less than or equal to 0, the resultant point is mintracevalue.

Example	:CALC:MATH TRACE1,PDIF,TRACE4,TRACE5,,
	sets Trace 1 to **Power Diff** trace math function, and sets the **First Trace** operand (for Trace 1) to Trace 4 and the **Second Trace** operand (for Trace 1) to Trace 5.
Key Path	**Trace/Detector, Math**

Power Sum (Op1+Op2)

Calculates a power sum between the **First Trace** operand and the **Second Trace** operand and puts the result in the destination trace.

During the sweep, the following formula is executed for each point in the trace operands, and the corresponding point is generated for the destination trace.:

DestinationTrace = 10 log(10(1/10)(FirstTrace) + 10(1/10)(SecondTrace))

The values of the trace points are assumed to be in a decibel scale, as they are internally stored.

If a point in either trace operand is equal to maxtracevalue, the resultant point is also maxtracevalue.

Example	:CALC:MATH TRACE1,PSUM,TRACE4,TRACE5,, sets Trace 1 to **Power Sum** trace math function and sets the **First Trace** operand (for Trace 1) to Trace 4 and the **Second Trace** operand (for Trace 1) to Trace 5.
Key Path	**Trace/Detector, Math**

Log Offset (Op1 + Offset)

Calculates a log offset from the **First Trace** operand and puts the result in the destination trace. The offset is entered as the active function. Each destination trace has its own offset.

During the sweep, the following formula is executed for each point in the trace operand, and the corresponding point is generated for the destination trace.:

DestinationTrace = FirstTrace + Offset

The values of the trace points are assumed to be in dBm (as they are internally stored) and the offset is in dB.

If a point in the trace operand is equal to maxtracevalue, the resultant point is also maxtracevalue.

If a point in the trace operand is equal to mintracevalue, the resultant point is also mintracevalue.

Example: If offset is 25 dB, then our destination trace will be higher than the operand trace by 25 dB.

The **Second Trace** operand is not used for this function.

Example	:CALC:MATH TRACE1,LOFF,TRACE4,,–6.00, sets Trace 1 to **Log Offset** trace math function, sets the **First Trace** operand (for Trace 1) to Trace 4, leaves the Second Trace operand (for Trace 1) unchanged (it is irrelevant for this function) and sets the Log Offset (for Trace 1) to –6 dB.
State Saved	The Log Offset value for each trace is saved in Instrument State
Min	–100 dB
Max	100 dB
Key Path	**Trace/Detector, Math**

Log Diff (Op1-Op2+Ref)

Offsets the difference between the **First Trace** operand and the **Second Trace** operand by a reference and puts the result in the destination trace. The reference is entered as the active function. Each destination trace has its own reference.

During the sweep, the following formula is executed for each point in the trace operands, and the corresponding point is generated for the destination trace.:

DestinationTrace = (FirstTrace - SecondTrace) + Reference

The values of the operand trace points are assumed to be in decibel units (as they are internally stored) and the reference is in dBm so the result is in dBm.

If a point in FirstTrace is equal to maxtracevalue, the resultant point is also maxtracevalue.

If a point in FirstTrace is equal to mintracevalue, the resultant point is also mintracevalue.

If neither of the above is true for a given point, then:

If that point in SecondTrace is equal to maxtracevalue, the resultant point is mintracevalue.

If that point in SecondTrace is equal to mintracevalue, the resultant point is maxtracevalue.

Example: If the first operand trace 1 is at 5 dBm, the second operand trace 2 is at –5 dBm, and the reference is –25 dBm, then the destination trace will be –15 dBm.

Example: If the first operand trace1 is at 60 dBuV, the second operand trace 2 is at 50 dBuV, and the reference is 35 dBuV, then the destination trace will be 45 dBuV.

Example	:CALC:MATH TRACE1,LDIF,TRACE4,TRACE5,,–6.00 sets Trace 1 to **Log Diff** trace math function, sets the **First Trace** operand (for Trace 1) to Trace 4, sets the **Second Trace** operand (for Trace 1) to Trace 5, and sets the Log Difference reference for Trace 1 to –6 dBm.
State Saved	The Log Difference reference value for each trace is saved in Instrument State
Min	Same as reference level
Max	Same as reference level
Key Path	**Trace/Detector, Math**
Default Unit	Depends on the current selected Y axis unit.

Off

Turns off Trace Math.

Example	CALC:MATH TRACE1 OFF turns off trace math for trace 1.

Remote Command Notes	See **Trace Math**
State Saved	The current trace math function is saved in Instrument State.
Key Path	**Trace/Detector, Math**

Operands

Selects the trace operand(s) to be used for the trace math functions for the destination trace.

Dependencies/Couplings	The destination trace cannot be an operand.
Remote Command Notes	The operands of the trace math commands () specify the trace operands. Since the operands are common to all math functions for a given trace, the most recently sent math function command sets the operands for each trace and are reflected on the trace operand keys.
Key Path	**Trace, Math**

Operand 1

Selects the first trace operand to be used for the trace math functions for the destination trace.

Dependencies/Couplings	The First Trace cannot be the same as the destination trace. The destination trace number is gray on the key, and the underline skips that number when selecting the trace.
Preset	Trace number – 2(wraps at 1). For example, for Trace 1, the First Trace presets to Trace 5; for Trace 6, it presets to Trace 4.
State Saved	The First Trace operand for each trace is stored in instrument state.
Key Path	**Trace, Math, Trace Operands**

Operand 2

Selects the second trace operand to be used for the trace math functions for the destination trace.

Dependencies/Couplings	The Second Trace cannot be the same as the destination trace. The destination trace number is gray on the key, and the underline skips that number when selecting the trace.
Preset	Trace number – 1(wraps at 1). For example, for Trace 1, the Second Trace presets to Trace 6; for Trace 6, it presets to Trace 5.
State Saved	The Second Trace operand for each trace is stored in instrument state
Key Path	**Trace, Math, Trace Operands**

Normalize

Displays menu keys that let you normalize trace data.

Key Path	**Trace/Detector**

Normalize On/Off

Normalize (On) activates the normalize function. On each sweep, the normalized trace (Trace 3) is subtracted from Trace 1 and the result is added to the normalized reference level. This arithmetic assumes all values are in decibel units, so we are actually taking a ratio.

First the following calculation is performed:

Trace 1 = (Trace 1D – Normalized Trace)

Where:

Trace 1D is the measured value of trace 1, as it comes from the SENSe subsystem.

Normalized Trace is Trace 3, in which you have previously stored a reference trace

all values are in decibel units.

This Trace 1 contains the values that will be returned from a trace query, or if the marker is placed on the trace.

For example, let's say bucket 1 on Trace 1 is at 0 dBm, and bucket 1 on Trace 3 is at 10 dBm. The reultant bucket is at 0 dBm – 10 dBm = –10 dB (just like with a delta marker).

You are also given the ability to define what (dB) value to use for Ref Level, and to define where on the screen the Ref Lvl line will appear using Normalized Refrence Position. This flexibility in displaying the result allows a wide range of devices, including amplifiers, to be tested using Normalize.

In the example above, bucket 1 has the value of –10 dB. Let us assume you have set Norm Ref Lvl to 5 dB. Thus bucket 1 will display 1.5 divisions below the Reference Level line (assuming 10 dB per division).

The Reference Level line is normally the top line of the graticule. If Norm Ref Posn is set to 10, this is the case. If it is set to 9, it is the next line down. If it is set to 5, it is the middle line of the graticule. If set to 0 it is the bottom line.

So in the example above, if Norm Ref Posn is set to 9, then bucket 1 will display 2.5 divisions below the top line of the graticule.

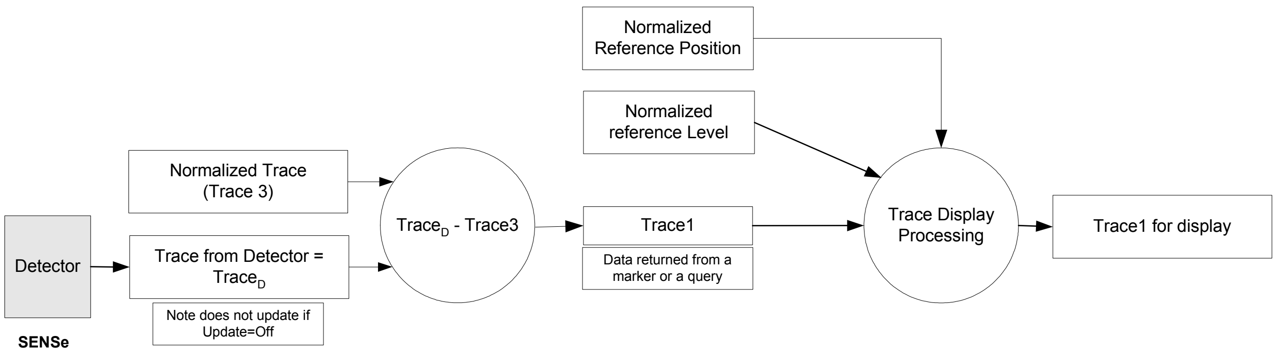
None of the manipulations of Norm Ref Posn and Norm Ref Lvl affect the data in the trace.

As Normalize displays a ratio between two traces (a difference, in dB) the Y-Axis Unit while in Normalize is dB in Log Amplitude and dimensionless in Linear. The Y Axis Unit chosen in the Y Axis Unit menu is unaffected by Normalize.and when you leave Normalize the Y Axis Unit returns to the value set in the Y Axis Unit menu. While in Normalize, all amplitude functions, such as Marker Y and the values in other traces, should be always in units of dB, and so should the returned trace query results. In other words, both trace query result and marker Y become independent of the Y Axis Unit chosen in the Y Axis

Unit menu when normalize is on.

Y Axis annotation is blanked while in Normalize. Any other traces on the display are plotted in dB, where the dB value used is equivalent to the dBm value of the trace. For example, if bucket 1 in trace 2 is at –40 dBm, that bucket is plotted at –40 dB. All traces use Norm Ref Lvl and Norm Ref Posn for positioning on the display. When Normalize exits, the normal Ref Lvl is restored. This normal Ref Level is unaffected by Normalize.

A block diagram showing how Normalize works is presented below:



The normalize function is most useful for applying correction data to a trace while making a stimulus-response measurement with a tracking generator (or synchronized source). For example, connect the cables and a through line, in place of the device to be measured, between the tracking generator and the analyzer input. Notice that the frequency response is not perfectly flat, showing the response of the cables, as well as the flatness of both the tracking generator and the analyzer. Now press Store Ref (1 3), Normalize On. Notice that the displayed trace is now flat, or normalized. The position of the normalized trace can now be moved to a different position on the display by changing the normalized reference position. This may be useful if the device to be tested has positive gain, such as an amplifier. Now replace the through line with the device under test, and an accurate measurement of the gain or loss can be made.

Remote Command	`:CALCulate:NTData[:STATe] OFF|ON|0|1` `:CALCulate:NTData[:STATe]?`
Example	`CALC:NTD ON` `CALC:NTD?`
Dependencies/Couplings	If Normalize (On) is pressed before Store Ref (1 3), an error message is generated. Normalize remains off in this case. Normalize is not available (grayed out) if any Trace Math function is on. When Normalize is turned on, Trace 1 is placed in Clear/Write with Update = On and Display = On.
Preset	OFF
State Saved	Saved in Instrument State.
Key Path	**Trace/Detector, Normalize**

Store Ref (1 -> 3)

Copies trace 1 into trace 3. Store Ref (1 3) must be pressed before pressing Normalize (On). This puts Trace 3 in Update=Off (not updating) and Display=On (visible).

Dependencies/Couplings	If Normalize (On) is pressed before Store Ref (1 3), an error message is generated. Normalize remains off in this case.
Remote Command Notes	There is no remote command for this function, however the trace copy command can be used for this purpose.
Key Path	**Trace/Detector, Normalize**

Show Ref Trace (Trace 3)

Views or blanks the reference trace on the display. The reference trace is trace 3, so this is the same as setting Trace 3's "Display" attribute.

Example	TRAC3:DISP 1 shows the reference trace.
Remote Command Notes	Use the TRAC3:DISP command to show or blank the reference trace. Trace 3 is always the reference trace by definition.
State Saved	Saved in Instrument State.
Key Path	**Trace/Detector, Normalize**

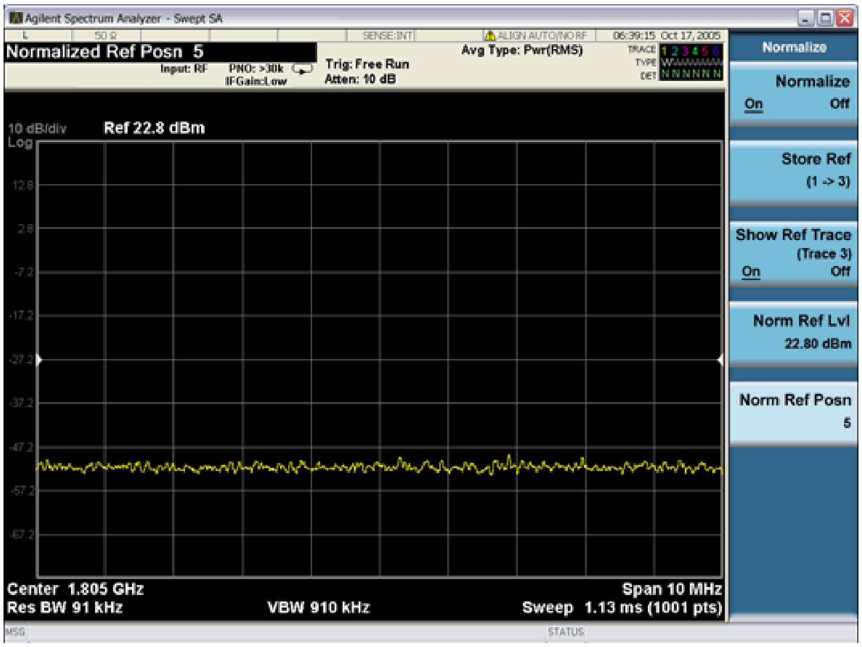
Norm Ref Lvl

Sets the level (in dB) of the normalized reference.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:NRLevel <rel_ampl>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:NRLevel?`
Example	DISP:WIND:TRAC:Y:NRL .10 dB DISP:WIND:TRAC:Y:NRL?
Preset	0 dB
State Saved	Saved in Instrument State.
Min	–327.6 dB
Max	327.6 dB
Key Path	**Trace/Detector, Normalize**

Norm Ref Posn

Offsets the displayed trace without affecting the instrument gain or attenuation settings. This allows the displayed trace to be moved without decreasing measurement accuracy. The normalized reference position is indicated with a right arrow on the left side of the display and a left arrow on the right side of the display, just inside the graticule. See picture below:



Detail of arrow:

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:NRPosition <integer>` `:DISPlay:WINDow[1]:TRACe:Y[:SCALe]:NRPosition?`
Example	DISP:WIND:TRAC:Y:NRP 5 DISP:WIND:TRAC:Y:NRP?
Remote Command Notes	The top and bottom graticule lines correspond to 10 and 0, respectively.
Preset	10
State Saved	Saved in Instrument State.
Min	0
Max	10
Key Path	**Trace/Detector, Normalize**

Copy/Exchange

This menu lets you copy any trace to any other trace, or exchange any trace with any other trace. The action is performed once.

The X Axis settings and domain of a trace go with it when it is copied or exchanged.

Remote Command

`:TRACe:COPY TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6, TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6`

`:TRACe:COPY?`

Example

TRAC:COPY TRACE1,TRACE3 copies Trace 1 to Trace 3 and puts Trace 3 in **Update=Off, Display=On**

Remote Command Notes

The :TRACe:COPY command supports 2 set of parameters:

:TRACe:COPY <source_trace>,<dest_trace>

where <source_trace>,dest_trace> can be one of the following parameters:TRACE1,TRACE2,TRACE3,TRACE4,TRACE5,TRACE6

Preset

`TRACE1, TRACE2`

Key Path

Trace/Detector

Remote Command

`:TRACe:EXCHange TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6, TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6`

`:TRACe:EXCHange?`

Example

TRAC:EXCH TRACE1,TRACE2 exchanges Trace 1 and Trace 2 and puts both traces in **Update=Off, Display=On**.

Remote Command Notes

The :TRACe:EXCHange command supports 2 set of parameters:

:TRACe:COPY <trace_1>,<trace_2>

where <trace_1>,<trace_2> can be one of the following parameters:TRACE1,TRACE2,TRACE3,TRACE4,TRACE5,TRACE6

Preset

`TRACE1, TRACE2`

From Trace

Selects the trace to be copied to or exchanged with the **To Trace.**

Remote Command Notes

See **Copy/Exchange**

Preset

1

Key Path

Trace/Detector, Copy/Exchange

To Trace

Selects the trace to be copied from or exchanged with the **From Trace.**

Remote Command Notes	See **Copy/Exchange**
Preset	2
Key Path	**Trace/Detector, Copy/Exchange**

Copy Now

Executes the Copy operation and puts the destination trace in **Update=Off, Display=On**.

Remote Command Notes	See **Copy/Exchange**
Key Path	**Trace/Detector, Copy/Exchange**

Exchange Now

Executes the Exchange operation and puts both traces in **Update=Off, Display=On**.

Remote Command Notes	See **Copy/Exchange**
Key Path	**Trace/Detector, Copy/Exchange**

Send/Query Trace Data (SCPI Command Only)

This command allows trace data to be sent to the analyzer or queried from the analyzer. The response to the query is a list of the amplitude points which comprise the requested trace in the current Y Axis Unit of the analyzer. The X Axis Unit is that of the destination trace (for send) or the source trace (for query).

The format and byte-ordering of the sent or received data will be dependent on the `FORMat:DATA` and `FORMat:BORDer` commands. `ASCII` data consists of a string of comma separated values. `REAL` or `INTeger` data is sent as a definite length block, with a header describing the data to follow.

For example, a four point trace might look like this if in ASCII (`FORMat:DATA ASCIi`):

–5.87350E+01, –5.89110E+01, –5.87205E+01, –5.12345E+01<NL><END>

and like this if in INTeger with 4 bytes per point (`FORMat:DATA INT,32`):

#216<16 bytes of data><NL><END>

where the 2 in the #216 means “2 digits of numeric data to follow”, and the 16 is the 2 digits and means “16 binary bytes to follow” (this is the definite length block format).

The data is terminated with <NL><END>. (For GPIB this is newline, or linefeed, followed by EOI set true. For LAN, this is newline only.)

The data format set by `FORMat:DATA` and `FORMat:BORDer` is used both for sending data to the instrument and receiving data from the instrument.

When sending data to the instrument, the data block must contain exactly the number of points currently specified in **Sweep, Points** or an error will be generated and there will be no change to the target trace.

No units terminator (for example, dB or V) is used when sending data; the data is taken as being in the current Y Axis Unit of the analyzer.

When a trace is sent to the instrument, it immediately overwrites all of the data in the target trace, even if that trace is inactive, or even if it is active and in the middle of a sweep. If in the middle of a set of **Trace Average** or **Max/Min Hold** operations, it can distort the result, so you must be careful. Similarly, when querying trace data, 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** when sending trace data to the analyzer or querying trace data from the analyzer.

Remote Command	`:TRACe[:DATA] TRACE1	TRACE2	TRACE3	TRACE4	TRACE5	TRACE6, <data>`
Dependencies/Couplings	Sweep points will affect the amount of data. The FORMat:DATA command describes the different types of data formats that can be used with trace data. Use the FORMat:BORDer command to set the byte order.
Remote Command Notes	The :TRACe[:DATA] command supports 2 set of parameters: :TRACe:COPY <trace>,<data> where <trace> can be one of the following parameters: TRACE1,TRACE2,TRACE3,TRACE4,TRACE5,TRACE6 and where <data> can be - ASCII data which consists of a string of values separated by comma or - REAL or INTeger sent as a definite length block, with a header describing the data to follow.

Remote Command	`:TRACe[:DATA]? TRACE1	TRACE2	TRACE3	TRACE4	TRACE5	TRACE6`
Example	TRAC TRACE1,–1,–2,–3,–4,–5 sends five points to Trace 1. Assuming that FORMat:DATA is set to ASCII, Y Axis Unit is set to dBm, and sweep points is set to 5, this will result in Trace 1 consisting of the five points –1 dBm, –2 dBm, –3 dBm, –4 dBm, and –5 dBm. TRAC? TRACE2 queries the analyzer for the contents of trace 2.

Format Data: Numeric Data (SCPI Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the `:TRACe[:DATA]`, `TRACe[:DATA]?` ,`:CALCulate:DATA[n]? and FETCh:SANalyzer[n]?` commands and queries.

Remote Command	`:FORMat[:TRACe][:DATA] ASCii | INTeger,32 | REAL,32 | REAL,64` `:FORMat[:TRACe][:DATA]?`
Remote Command Notes	The query response is: ASCii: `ASC,8` INTeger,32: `INT,32` 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).
Preset	ASCii

Format Data: Byte Order (SCPI Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the `:TRACe[:DATA]`, `TRACe[:DATA]?` ,`:CALCulate:DATA[n]? and FETCh:SANalyzer[n]?` commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

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

Smooth Trace Data (Remote Command Only)

Not recommended for new designs.Use the CALCulate:DATA:COMPress command instead.

Smooths the trace according to the number of points specified in

:TRACe:MATH:SMOoth:POINts. There is no equivalent front panel function.

The purpose of this function is to perform a spatial video averaging, as compared to the temporal version supplied by the video-average command [:SENSe]:AVERage:TYPE VIDeo. The functions of :TRACe:MATH:SMOoth <trace> and [:SENSe]:AVERage:TYPE VIDeo|POWer are not interchangeable.

Remote Command	:TRACe:MATH:SMOoth TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6

Number of Points for Smoothing (Remote Command Only)

Not recommended for new designs. (Will not be supported in future designs.) Use the CALCulate:DATA:COMPress command instead.

Specifies the number of points that will be smoothed. Increasing the number of points increases smoothing at the cost of decreasing resolution. If the number of points is an even number, then the number of points is increased by one. If the number of points is larger than the number of sweep points, then the number of sweep points is used, unless the number of sweep points is even, in which case the number of points will be the sweep points minus one. The number of points smoothed is always an odd number.

Remote Command	:TRACe:MATH:SMOoth:POINts <interger> :TRACe:MATH:SMOoth:POINts?
Example	TRAC:MATH:SMO:POIN 501
Remote Command Notes	Only odd values allowed; if <integer> even, add 1 unless <integer> = number of sweep points, in which case subtract 1 Used with the TRACe:MATH:SMOoth command.
Preset	11
Min	3
Max	Number of sweep points

Mean Trace Data (Remote Command Only)

Not recommended for new designs. Use the CALCulate:DATA:COMPress command instead.

Returns the mean of the amplitudes of the trace amplitude elements in measurement units.

Remote Command	:TRACe:MATH:MEAN? TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6
Example	TRAC:MATH:MEAN? TRACE2

Calculate/Compress Trace Data Query (SCPI Command Only)

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.

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).

MAX, MEAN, DME, MIN, RMS, SAMP, and SDEV 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.

MAXimum - returns the maximum data point for the specified region(s) of trace data.

MINimum - returns the minimum data point for the specified region(s) of trace data.

MEAN - returns the arithmetic mean of the data point values (expressed in dB/dBm) for the specified region(s) of trace data. The Mean Value of Data Points for Specified Region(s) may be expressed as:

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

where Xi is a data point value, and n is the number of data points in the specified region(s).

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. The mean of the log is a superior 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.

DMEan - returns the mean power (in dB/dBm) of the data point values for the specified region(s) of trace data. The DMEan Value of Data Points for Specified Region(s) may be expressed as:

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

RMS - returns the average power, on a root-mean-squared voltage scale, of the data point values for the specified region(s) of trace data.

The RMS Value of Data Points for Specified Region(s) may be expressed as:

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

where Xi is a data point value, and n is the number of data points in the specified region(s).

NOTE This function is very useful for linear 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.

Once you have the rms value for a region of linear trace data, you may want to calculate the mean power. You may convert this rms value (peak volts) to power in dBm:

10 * log[10 * (rms value)2]

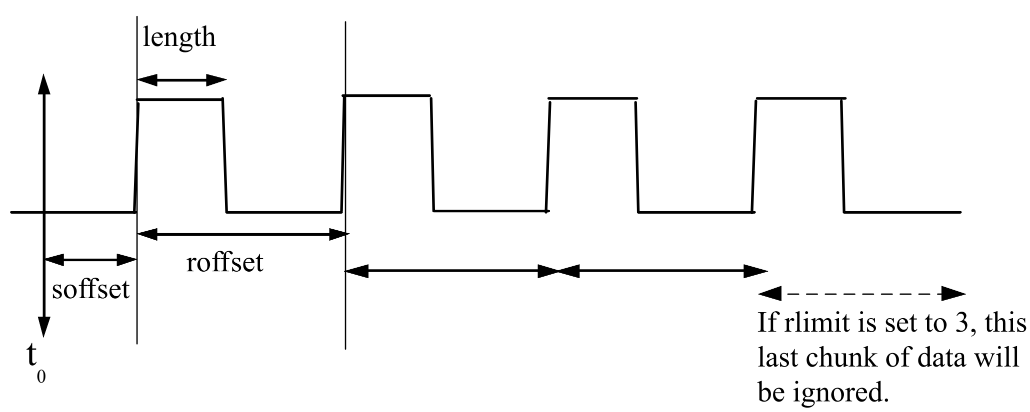
SAMPle - returns the first data value for the specified region(s) of trace data.

SDEViation - returns the arithmetic standard deviation for the data point values for the specified region(s) of trace data. The SDEV of Data Points Values for Specified Region(s) may be expressed as:

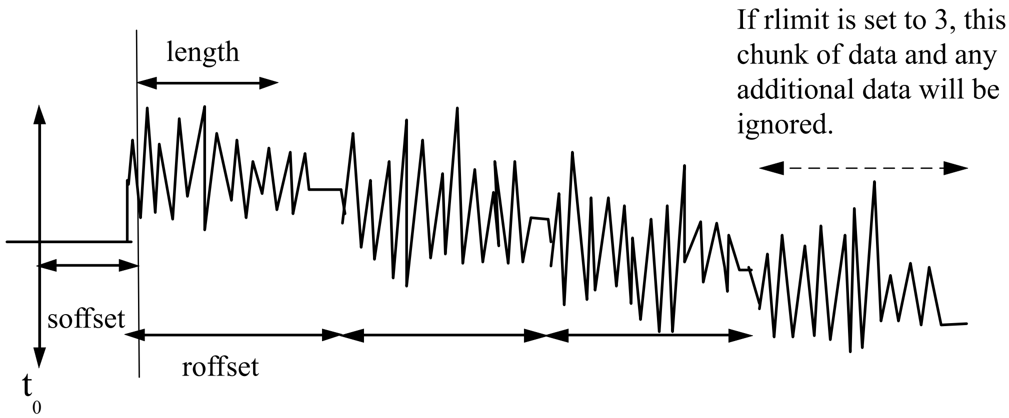
$$\mathrm{SDEV} = \sqrt{\frac{1}{n} \sum_{Xi \in \mathrm{region(s)}} (Xi - \bar{X})^2}$$

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).

Sample Trace Data - Constant Envelope



Sample Trace Data - Not Constant Envelope



<soffset> - start offset is an optional real number (in seconds for time-domain traces, 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 (in seconds for time-domain traces, 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 (in seconds for time-domain traces, 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. 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.

Example:

To query the mean power of a set of GSM bursts:

Set the waveform measurement sweep time to acquire at least one burst.

Set the triggers such that acquisition happens at a known position relative to a burst.

Then query the mean burst levels using CALC:DATA2:COMP? MEAN,24e–6,526e–6 (These parameter values correspond to GSM signals, where 526e–6 is the length of the burst in the slot and you just want 1 burst.)

The optional parameters must be entered in the specified order. For example, if you want to specify <length>, you must also specify <soffset>.

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.

View/Display

The View/Display key opens the View menu for the current measurement. This menu includes the **Display** key for controlling items on the display.

The **Display** key precedes the **View** keys. The “views” that are available are specific to the current measurement selected under the **Meas** key.

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

Use to turn on/off various parts of the display annotation. The annotation is divided up into four categories:

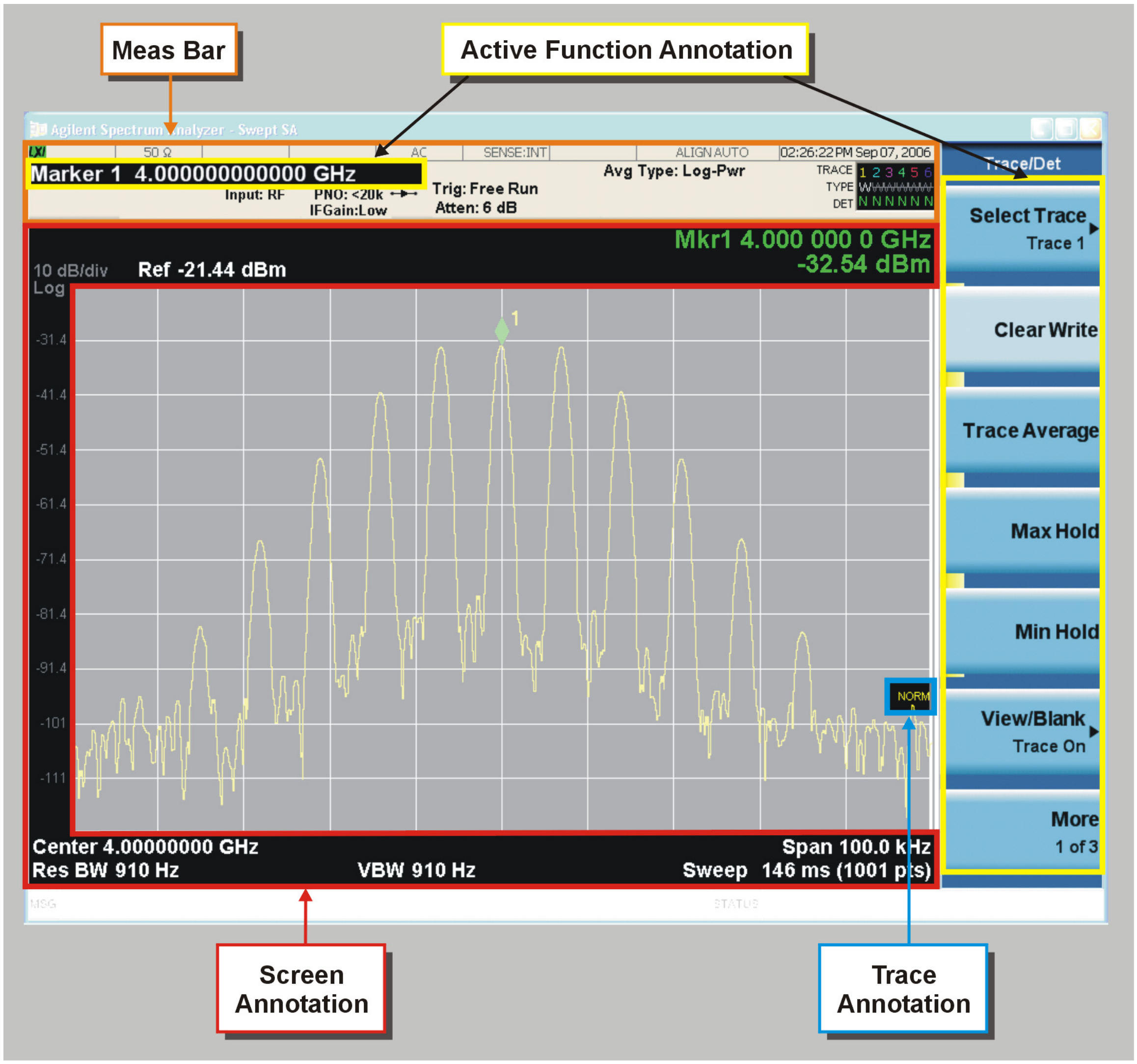
Meas Bar: This is the measurement bar at the top of the screen. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.

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.

Trace annotation–these are the labels on the traces, showing their detector (or their math mode).

Active Function annotation–this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the following figure. 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.

Remote Command	`:DISPlay:ANNotation:MBAR[:STATe] OFF|ON|0|1`
	`:DISPlay:ANNotation:MBAR[:STATe]?`
Example	DISP:ANN:MBAR OFF
Dependencies/Couplings	Grayed out and forced to OFF when **System Display Settings, Annotation** is set to Off.

Preset	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, and so forth) 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.

Remote Command	`:DISPlay:ANNotation:SCReen[:STATe] OFF|ON|0|1`
	`:DISPlay:ANNotation:SCReen[:STATe]?`
Example	DISP:ANN:SCR OFF
Dependencies/Couplings	Grayed out and forced to OFF when **System Display Settings, Annotation** is set to Off.
Preset	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.

Remote 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.
Key Path	**View/Display, Display, Annotation**

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.

All of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature.

Remote Command	`:DISPlay:ACTivefunc[:STATe] ON|OFF|1|0` `:DISPlay:ACTivefunc[:STATe]?`
Example	DISP:ACT OFF
Dependencies/Couplings	Grayed out and forced to OFF when **System Display Settings, Annotation** is set to Off.
Preset	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.

Pressing this key cancels any active function.

When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or backspace (BKSP) can be used to go back over previous characters.

Remote Command	`:DISPlay:ANNotation:TITLe:DATA <string>` `:DISPlay:ANNotation:TITLe:DATA?`
Example	DISP:ANN:TITL:DATA “This Is My Title”
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.

Remote Command	`:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF|ON|0|1` `:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?`
Example	DISP:WIND:TRAC:GRAT:GRID OFF
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, and so forth) it is drawn on top of all traces.

The display line is unaffected by Auto Couple.

Remote Command	`:DISPlay:WINDow[1]:TRACe:Y:DLINe <ampl>`
	`:DISPlay:WINDow[1]:TRACe:Y:DLINe?`
	`: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 –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**
Knob Increment/Decrement	Display scale Log: Step/100 but never < 0.01 dB, Clicks/360º = 160 (5 rev/FS) Display scale Linear: Step/10 but never < 0.1 dB, Clicks/360º = 24 (4 rev/FS) For the linear amplitude units, the knob has the same dB increments as when amplitude units is set to be dB. The only difference is that the annotation is shown in the linear units, and the numeric entry terminator key set is different.
Default Unit	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 also be overridden but not changed. Then if this function turns off, the settings will be returned to their local values.

Remote Command	`:DISPlay:WINDow[1]:ANNotation[:ALL] OFF|ON|0|1` `:DISPlay:WINDow[1]:ANNotation[:ALL]?`
Example	:DISP:WIND:ANN OFF

Preset	On (set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
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.

Remote Command	`:DISPlay:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:DISPlay:THEMe?`
Example	`DISP:THEM TDM` sets the display theme to 3D Monochrome.
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
Preset	TDColor (set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Key Path	**View/Display, Display, System Display Settings**

Backlight On/Off

Allows you to turn the backlight On or Off. This setting interacts 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.

Pressing this softkey (Backlight On/Off) will turn the backlight back on, simply because a key has been pressed, and then will turn it back off as the key action is taken. So the display will flash and go back to being off.

Remote Command	`:DISPlay:BACKlight ON	OFF` `:DISPlay:BACKlight?`
Preset	ON (set by Restore Misc Defaults)
Key Path	**View/Display, Display, System Display Settings**

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.

Remote Command	`:DISPlay:BACKlight:INTensity <integer>`
	`:DISPlay:BACKlight:INTensity?`
Example	DISP:BACK:INT 50
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.

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 Mode Global function; hence it is not cancelled by the Preset key.

Remote Command	`:DISPlay:FSCReen[:STATe] OFF|ON|0|1`
	`:DISPlay:FSCReen[:STATe]?`
Preset	By SYST:DEF MISC
State Saved	Not saved in state.
Key Path	**Display**

Display Enable (Remote Command Only)

Turns the display On/Off, including the display drive circuitry and the backlight. The goals of 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 and backlight

For security purposes

If you have turned off the display:

> and you are in local operation, the display can be turned back on by pressing any key or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)
>
> and you are in remote operation, the display can be turned back on by pressing the Local or **Esc** keys or by sending the SYSTem:DEFaults MISC command or the DISPlay:ENABle ON (neither *RST nor SYSTem:PRESet enable the display.)
>
> and you are using either the SYSTem:KLOCk command or GPIB local lockout, then no front panel key press will turn the display back on. You must turn it back on remotely.

Remote Command	`:DISPlay:ENABle OFF|ON|0|1`
	`:DISPlay:ENABle?`
Example	DISP:ENAB OFF
Dependencies/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	By SYST:DEF MISC but Not affected by *RST or SYSTem:PRESet
State Saved	Not saved in instrument state.

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4 Marker Functions

Marker

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.

The SCPI command in the table below selects the marker and 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.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|FIXed|OFF` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Preset	OFF (all markers)
State Saved	The marker control mode is saved in instrument state
Key Path	Front-panel key

Control Mode

There are four control modes for markers:

Normal (`POSition`) - A marker that can be moved to any point on the X Axis by specifying its X Axis value, and whose absolute Y Axis value is then the value of the trace point at that X Axis value.

Delta (`DELTa`) - A marker that can be moved to any point on the X Axis by specifying its X Axis offset from a reference marker, and whose absolute Y Axis value is then the value of the trace point at that X Axis value.

Fixed (`FIXed`) - A marker whose X Axis and Y Axis values may be directly or indirectly specified by you, but whose Y Axis value remains fixed, once specified, and does not follow the trace. Fixed markers are useful as reference markers for Delta markers, as operands in a Peak Search operation, and as arbitrary reference points can be set by you. These markers are represented on the display by an “X” rather than a diamond.

Off (`OFF`) - A marker which is not in use.

In the Swept SA measurement, the Preset control mode is **Off** for all markers. The command below sets the marker X Axis value in the current marker X Axis Scale unit. In each case the marker that is addressed becomes the selected marker. It has no effect (other than to cause the marker to become selected) if the control mode is **Off**, but it is the SCPI equivalent of entering an X value if the control mode is **Normal, Delta,** or **Fixed**.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Remote Command Notes	If no suffix is sent it will use the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an invalid suffix error will be generated. If the specified marker is Fixed and a Marker Function is on, a message is generated. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning. The query returns the marker’s absolute X Axis value if the control mode is **Normal** or **Fixed**. It returns 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, if X is queried with no value sent first, the center of screen value will be returned. This will depend on the frequency range of the instrument. 13.255 GHz is correct for the 26 GHz instruments only (Option 526).
Min	– ∞ (minus infinity)
Max	+ ∞ (plus infinity)
Default Unit	determined by X Axis Scale

The command below sets the marker X position in trace points. It has no effect if the marker control mode is **Off**. But it is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** or **Fixed** – except the setting is in trace points rather than X Axis Scale units.

NOTE The entered value in Trace Points is immediately translated into the current X Axis Scale units for setting the value of the marker. The marker’s value in X Axis Scale Units, NOT trace points, will be preserved if a change is made to the X Axis scale settings. Thus, if you use this command to place a marker on bucket 500, which happens at that time to correspond to 13 GHz, and then you change the Start Frequency so that bucket 500 is no longer 13 GHz, the marker will stay at 13 GHz, NOT at bucket 500! This is important to realize as it differs from the behavior of past Agilent analyzers.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Remote Command Notes	If the specified marker is Fixed and a Marker Function is on, a message is generated. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "–221, Settings conflict" warning.
	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal** or **Fixed**. It returns 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
Preset	After a preset, if X is queried with no value sent first, the center of the screen value will be returned. So if per default, the number of Trace points is 1001, the center value will be 500.
Min	0
Max	Number of trace points – 1
Default Unit	unitless

The command below selects the marker and sets the marker Y Axis value; the default unit is the current Y Axis unit. It has no effect (other than selecting the marker) unless the marker control mode is **Fixed.**

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y <real>`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:MARK2:MODE POS turns on marker 2 as a normal marker.
	CALC:MARK2:X 20 GHZ moves marker 2 to 20 GHz if X Axis Scale is Frequency. If X Axis Scale is Time, the –131 invalid suffix error is generated.
Preset	Trace value at center of screen. There is no way to predict what this will be after a preset.
Min	– ∞ (minus infinity)
Max	+ ∞ (plus infinity)

Select Marker

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

Preset	Marker 1
State Saved	The number of the selected marker is saved in instrument state.
Key Path	**Marker**

Normal

Sets the control mode for the selected marker to **Normal** and turns on the active function for setting its value. If the selected marker was **Off**, it is placed at the center of the screen on the trace specified by the marker's Trace attribute.

A **Normal** mode (POSition type) marker can be moved to any point on the X Axis by specifying its X Axis value. Its absolute Y Axis value is then the value of the trace point at that X Axis value.

Example	:CALC:MARK:MODE POS sets Marker 1 to Normal.
Dependencies/Couplings	The marker addressed by this command becomes the selected marker on the front panel
Remote Command Notes	See the description under the **Marker** key.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X Axis value are saved in instrument state.
Key Path	**Marker**

Delta

Sets the control mode for the selected marker to Delta and turns on the active function for setting its delta value. If the selected marker was **Off**, it is placed at the center of the screen on the trace specified by the marker's Trace attribute.

In Delta mode the marker result shows the relative result between the selected (Delta) marker and its reference marker. A delta marker can be moved to any point on the X Axis by specifying its X Axis offset from a reference marker. Its absolute Y Axis value is then the value of the trace point at that X Axis value.

Example	:CALC:MARK:MODE DELT sets marker 1 to Delta.
Remote Command Notes	See the description under the **Marker** key.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X Axis value are saved in instrument state.
Key Path	**Marker**

Fixed

Sets the control mode for the selected marker to Fixed. A fixed marker is fixed in the sense that it stays where you place it. It can be directly moved in both X and Y. It can be moved with a Peak Search. It can also be indirectly moved by re-zeroing the delta if it is a relative marker. If it is moved, it again becomes fixed at the X Axis point it moved to and it has a Y-axis result that it took on when it moved there. If a Normal or Delta marker is changed to Fixed it becomes fixed at the X Axis point it was at, and with the Y-axis result it had when it was set to Fixed.

In Fixed mode the marker result shows:

- If no Marker Function is on, the absolute X Axis and Y axis value of the marker.
- If a Marker Function is on, the X Axis value and the Y-axis function result in the one the marker had when it became fixed.

Example	:CALC:MARK:MODE FIX sets Marker 1 to Fixed.
Dependencies/Couplings	You cannot directly set the X or Y value of a Fixed marker which has a Marker Function turned on. If an attempt is made to actually adjust it while a Marker Function is on, a message is generated. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning. You cannot directly set the Y value of a Fixed marker while Normalize is turned on. If an attempt is made to do so while Normalize is on, a message is generated. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning.
Remote Command Notes	See the description under the **Marker** key.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X and Y Axis values are saved in instrument state.
Key Path	**Marker, Fixed**

Example	:CALC:MARK:MODE FIX sets Marker 1 to Fixed.
Dependencies/Couplings	You cannot directly set the X or Y value of a Fixed marker which has a marker function turned on. If an attempt is made to actually adjust it while a Marker Function is on, a message is generated. If the key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning.
Remote Command Notes	See the description under the **Marker** key.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X and Y Axis values are saved in instrument state.
Key Path	**Marker, Fixed**

Default Unit	Depends on the current selected Y axis unit.

Off

Turns off the selected marker and its marker function setting, if any. However, Off does not affect which marker is selected.

Example	:CALC:MARK:MODE OFF sets Marker 1 to Off.
Remote Command Notes	See the **Marker** key description.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) is saved in instrument state.
Key Path	**Marker**

Properties

Opens a menu used to set certain properties of the selected marker.

Key Path	**Marker**

Select Marker

Refer to the Select Marker key information under the Marker front-panel key.

Relative To

Selects the marker that the selected marker will be relative to (its reference marker).

Every marker has another marker to which it is relative. This marker is referred to as the “reference marker” for that marker. This attribute is set by the **Marker, Properties, Relative To** key. The marker must be a **Delta** marker to make this attribute relevant. If it is a **Delta** marker, the reference marker determines how the marker is controlled and how its value is displayed. A marker cannot be relative to itself.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence ?`
Example	CALC:MARK1:REF 2 sets marker 1’s reference marker to 2 and turns marker 1 on as a delta marker.
Dependencies/Couplings	The act of specifying the selected marker’s reference marker makes the selected marker a Delta marker. If the reference marker is off it is turned on in **Fixed** mode at the delta marker location.

Remote Command Notes	This command causes the marker specified with the subopcode to become selected. Range (for SCPI command): 1 to 12. If the range is exceeded the value is clipped.
Preset	The preset default “Relative To” marker (reference marker) is the next higher numbered marker (current marker +1). For example, if marker 2 is selected, then it’s default reference marker is marker 3. The exception is marker 12, which has a default reference of marker 1. Set to the defaults by using **Restore Mode Defaults**. This is not reset by **Marker Off**, **All Markers Off**, or **Preset**.
State Saved	Saved in instrument state. Not affected by Marker Off and hence not affected by Preset or power cycle.
Min	1
Max	12
Key Path	**Marker, Properties**
SCPI Status Bits/OPC Dependencies	none Default (selected when **Restore Mode Defaults** is pressed): next higher numbered marker or 1 if marker 12.

X Axis Scale (formerly Readout)

Accesses a menu that enables you to affect how the X Axis information for the selected marker is displayed in the marker area (top-right of display) and the active function area of the display and how the marker is controlled. The available settings for the X Axis Scale are Frequency, Period, Time, and Inverse Time.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:READout FREQuency|TIME|ITIMe|PERiod`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:READout ?`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:READout :AUTO ON|OFF|1|0`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:READout :AUTO?`

Example	CALC:MARK3:X:READ TIME sets the marker 3 X Axis Scale to Time.
Remote Command Notes	This command causes the specified marker to become selected.
Preset	AUTO Marker Preset (selected when a marker is turned **Off**): **Auto**. In most measurements the Auto settings results in Frequency being the preset readout.

State Saved	Saved in instrument state.
Key Path	**Marker, Properties**

Auto

When in Auto, the X Axis Scale is **Frequency** if the Marker Trace is a frequency domain trace, **Time** if the Marker Trace is a time domain trace. When in Auto, if the marker changes traces, or the domain of the trace the marker is on changes, the Auto result is re-evaluated. If the X Axis Scale is chosen manually, that Scale is used regardless of the domain of the trace.

Example	CALC:MARK2:X:READ:AUTO ON sets the marker 2 X-axis scaling to automatically select the most appropriate units.
Key Path	**Marker, Properties, X Axis Scale**

Frequency

Sets the marker X Axis scale to Frequency, displaying the absolute frequency of a normal marker or the frequency of the delta marker relative to the reference marker. Frequency is the auto setting for frequency domain traces.

If Frequency is selected for a time domain trace, all of the points in the trace will show the same value. Attempting to use the knob or step keys to adjust the X Axis value of the marker or entering an X Axis value from the numeric keypad or remotely will have no effect but will generate no error.

Example	CALC:MARK2:X:READ FREQ sets the marker 2 X Axis scale to Frequency.
Remote Command Notes	See the X Axis Scale key description.
State Saved	The X Axis Scale setting is saved in instrument state
Key Path	**Marker, Properties, X Axis Scale**

Period

Sets the marker X Axis scale to Period, displaying the reciprocal of the frequency of the marker, or the reciprocal of the frequency separation of the two markers in a delta-marker mode. The units are those of time (sec, msec, etc). If the markers are at the same frequency in a delta marker mode, the result will be the reciprocal of 0, which is infinitely large. The display will show “---“ and a SCPI query will return infinity.

If Period is selected for a time domain trace, all of the points in the trace will show the same value. Attempting to use the knob or step keys to adjust the X Axis value of the marker or entering an X Axis value from the numeric keypad or remotely will have no effect, but will generate no error.

Example	CALC:MARK2:X:READ PER sets the marker 2 X Axis scale to Period.

Remote Command Notes	See the X Axis Scale key description.
State Saved	The X Axis Scale setting is saved in instrument state.
Key Path	**Marker, Properties, X Axis Scale**

Time

Sets the marker X Axis scale to Time, displaying the time interval between a normal marker and the start of a sweep or the time of the delta marker relative to the reference marker. Time is the auto setting for time domain traces. In a delta-marker mode it is the (sweep) time interval between the two markers.

Example	CALC:MARK2:X:READ TIME sets the marker 2 X Axis Scale to Time
Dependencies/Couplings	Frequency domain traces taken in FFT mode have no valid time data. Therefore when Time is selected for markers on such traces, the X Axis value is taken as the appropriate percentage of the displayed sweep time, which is a calculated estimate.
Remote Command Notes	See the X Axis Scale key description.
State Saved	The X Axis Scale setting is saved in instrument state.
Key Path	**Marker, Properties, X Axis Scale**

Inverse Time

Sets the marker X Axis scale to Inverse Time, displaying the reciprocal time. It is useful in a delta mode to show the reciprocal of (sweep) time between two markers. This function is only meaningful when on a time domain trace and in the **Delta** control mode. If the markers are at the same X Axis value, the time between them is 0, so the reciprocal of sweep time is infinitely large. The display will show “---“ and a SCPI query will return infinity.

Example	:CALC:MARK2:X:READ ITIM sets the marker 2 X Axis scale to Inverse Time.
Dependencies/Couplings	Frequency domain traces taken in FFT mode have no valid time data. Therefore when Inverse Time is selected for markers on such traces, the X Axis value is undefined, shows as “---“ and returns not a number to a query.
Remote Command Notes	See the X Axis Scale key description.
State Saved	The X Axis Scale setting is saved in instrument state
Key Path	**Marker, Properties, X Axis Scale**

Marker Trace

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

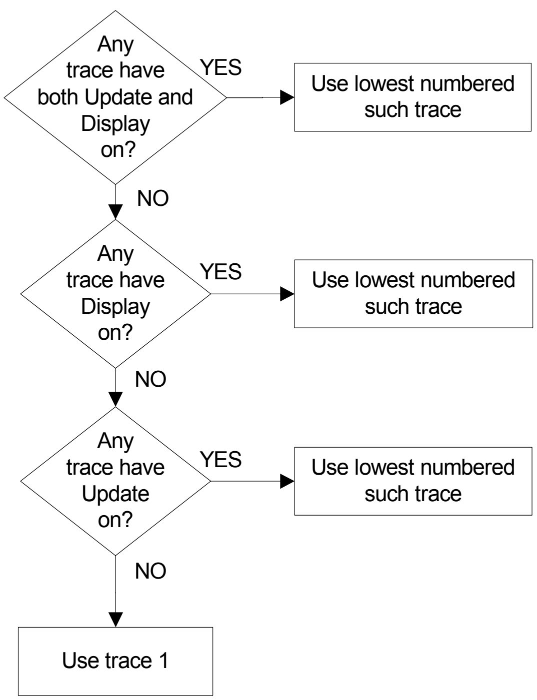
When **Auto Init** is true, the marker's trace attribute is re-determined automatically by the analyzer whenever the marker turns on (Normal, Delta or Fixed) from an Off state. (The trace attribute is also determined for all markers that are on, whenever **Auto Init** is turned on).

When the marker moves between traces the marker's X position in trace points is retained as it moves. For moving between active traces this generally means the x-axis value of the marker will not change. But for moving to or from an inactive trace, the x-axis value will take on that of the new trace at the bucket the marker was on the old trace (and is still on, on the new trace, since the bucket doesn't change).

NOTE	This is true even if the marker is off screen. Thus, a marker that is at the center of the screen on the old trace stays at the center of the screen on the new trace. A marker that is off screen one whole screen to the left on the old trace remains off screen one whole screen to the left on the new trace – even if this means it will be at negative time.

Marker Trace is set to 1, and Auto Init is set to On, on a Preset or All Markers Off.

The following flowchart depicts the Auto Init rules:



Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe 1|2|3|4|5|6`
	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`

Example	CALC:MARK1:TRAC 2 places marker 1 on trace 2.
Dependencies/Couplings	This is not affected by Auto Coupling. Sending the remote command causes the addressed marker to become selected.
Preset	Presets on Preset or All Markers Off
State Saved	The Marker Trace and state of **Auto Init** for each marker is saved in instrument state.
Min	1
Max	6
Key Path	**Marker, Properties**

Marker Trace Auto Init (Remote command only) This command associates the marker with the specified trace and turns Marker Trace Auto Init OFF for that marker. If the marker is not **Off** it moves the marker from the trace it was on to the new trace. If the marker is **Off** it stays off but is now associated with the specified trace.

The query returns the number of the trace on which the marker is currently placed, even if that marker is in Auto mode.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe:AUTO OFF|ON|0|1` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe:AUTO?`
Remote Command Notes	Turning Marker Trace Auto Init off has no effect on the trace on which the marker is currently placed. The response to the query will be 0 if OFF, 1 if ON.
Preset	ON

Lines

When on, displays a vertical line of graticule height and a horizontal line of graticule width, intersecting at the indicator point of the marker (that is, the center of the X or the bottom tip of the diamond. The lines are blue (0,0,255) in color.

If the marker is off screen the lines should be extended from the marker so that they go through the screen area if possible. This is really useful for off screen Fixed markers as it lets you see their amplitude even though they are off the X Axis.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:LINes[:STATe] OFF|ON|0|1` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:LINes[:STATe]?`
Example	:CALC:MARK2:LIN:ON turns Lines on for marker.

Dependencies/Couplings	Sending the remote command causes the addressed marker to become selected.
Preset	OFF
State Saved	Saved in State.
Key Path	**Marker, Properties**

Marker Table

Turns the state of the Marker Table On or Off.

Remote Command	`:CALCulate:MARKer:TABLe[:STATe] OFF|ON|0|1` `:CALCulate:MARKer:TABLe[:STATe]?`
Example	CALC:MARK:TABL ON turns on the marker table.
Preset	OFF
State Saved	Whether the marker table is on is saved in instrument state
Key Path	**Marker**

Marker Count

Accesses the marker count menu.

Key Path	**Marker**

Counter On/Off

Turns the marker frequency counter on and off. The selected marker is counted, and if the selected marker is a delta marker and its reference marker is not fixed, the reference marker is counted as well.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FCOunt[:STATe] OFF|ON|0|1` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FCOunt[:STATe]?`
Example	CALC:MARK2:FCO ON selects marker 2, turns it on, and turns on the counter. CALC:MARK2:FCO:X? returns the counted frequency.
Dependencies/Couplings	If the selected marker is **Off** when the counter is turned on, the selected marker is set to Normal and placed at the center of the screen on the trace determined by the Marker Trace rules. The counter is turned OFF when the selected marker is turned OFF.

Remote Command Notes	This command causes the specified marker to become selected.
Preset	OFF
State Saved	The state of the counter (On/Off) is saved in instrument state. In the case of Fixed markers, the count stored in the marker is saved in instrument state.
Key Path	**Marker Fctn, Marker Count**

Using the internal counter we can count the frequency of a marker, but we cannot count while we are actually sweeping. So, once we are done with a sweep, we move to the selected marker frequency and count that frequency. Then, if the marker is a Delta marker, the count is also taken for its reference marker. The count is actually performed by moving the LO to the frequency (or frequencies in the case of a delta marker) we wish to count. The count is executed on a marker by marker basis and no further count is taken until after the next sweep (even if the marker moves before another sweep has completed).

The Marker Count is taken by tuning the instrument to the frequency of the marker and counting the IF, with the instrument not sweeping. The count is adjusted for display by adding or subtracting it (as appropriate) from the LO frequency, so that you see a count that represents the signal frequency. This is true even if External Mixing is on. Since all this happens between sweeps, you never see the instrument retuning to do the counts.

Fixed markers have a count stored in them that is generally kept fixed and not updated. If a fixed marker is selected, or used as a reference, the signal at the marker frequency is not counted; rather the stored count is seen or used as the reference.

If you wish to see the entered frequency of a counted marker it will appear in the active function area when that marker is selected (for Fixed markers, you have to use the hollow point function to view or adjust the x or y marker values.

If the selected marker is off the X-axis the instrument can still be tuned to the marker (unless it is outside the range of the instrument), so the count can still be displayed. This means you can see a count for an off screen marker even though there may be no valid Y-value for the marker. If the marker frequency is outside the range of the instrument, the display will show three dashes in the count block (---), and not a number is returned to a SCPI count query.

When a Delta Marker is selected while Marker Count is on:

If the reference marker is not a fixed marker, the display shows the difference between the count of the selected marker and the count of the reference marker

If the reference marker is a fixed marker and there is a count stored in the marker (because Marker Count was on when the marker became a fixed marker), the display shows the difference between the count at the marker and the count stored in the reference marker.

Marker Count works in zero span as well as in Swept SA. The instrument tunes to the frequency of the selected marker, which, for active zero span traces, is simply the center frequency of the analyzer.

Fixed markers have a count stored in them that is generally kept fixed and not updated. If a fixed marker is selected, or used as a reference, the signal at the marker frequency is not counted; rather the stored count is seen or used as the reference. The count is stored, if Count is on, when the marker becomes fixed or when, while fixed, the marker is moved by re-zeroing the reference (if it is the reference marker) or via a peak search (since both of these, by definition, use valid trace data). The count stored in a Fixed marker is lost if the counter is turned off, if the marker is moved to an inactive trace, or if the marker is moved by adjusting its x-value.

When the counter is on, the count (or the delta count) for the selected marker is displayed.

The invalid data indicator (*) will turn on until the completion of the first count.

Marker Count frequency readings are corrected using the **Freq Offset** function. However, Marker Delta readings are not corrected, as any offset would be applied to both.

In zero span on active traces the counter continues to function, counting any signal near the center frequency of the analyzer.

NOTE	No signal farther from the marker frequency than the Res BW will be seen by the counter.

The above command turns on or off the frequency counter. If the specified marker number in the command is not the selected marker, it becomes the selected marker. If the specified marker number is not on, FCOunt ON sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. Once the Marker Count is on, it is on for any selected marker, not just for the one used in the command. A 1 is returned to the state query only if marker count is on and the specified number is the selected marker. The invalid data indicator (*) will turn on until the completion of the first count, but this does not keep a value from being returned.

Query count value:

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FCOunt:X?`
Remote Command Notes	This query does NOT cause the specified marker to become selected.

The above command queries the frequency count.

The query returns the absolute count unless the specified marker is in Delta mode, then it returns the relative count. A marker with no stored count, or a non-**Fixed** marker on a stored trace, will also return not a number to a SCPI count query. This result may mean that the first sweep after the counter turned on has not yet completed.

Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not Fixed or 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).

Fixed markers do not couple. They stay where they were while all the other markers move. Of course, if a Fixed marker is being moved, all the non-fixed markers do move with it.This may result in markers going off screen.

Remote Command	`:CALCulate:MARKer:COUPle[:STATe] OFF|ON|0|1`
	`:CALCulate:MARKer:COUPle[:STATe]?`
Example	:CALC:MARK:COUP ON sets Couple Markers on.
Preset	Off, presets on Mode Preset and All Markers Off.
State Saved	Saved in State.
Key Path	**Marker**

All Markers Off

Turns off all markers. See Marker, Off.

Remote Command	`:CALCulate:MARKer:AOFF`
Example	CALC:MARK:AOFF turns off all markers.
Dependencies/Couplings	Sets the selected marker to 1.
Preset	n/a.
Key Path	**Marker**

Marker Fctn

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.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion NOISe|BPOWer|BDENsity|OFF` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`
Dependencies/Couplings	Fixed markers: It is not possible to change the Band Function for a Fixed marker; so all of the Band Function keys are grayed out for a Fixed marker. If a marker function was already on when the marker became Fixed then the selected Band Function is shown but cannot be changed. Therefore, you cannot directly set the X or Y value of a Fixed marker which has a marker function turned on. To turn off the function, turn off the marker.
Remote Command Notes	Sending this command selects the subopcoded marker. The marker function result is queried in the same fashion as the Marker Result, as outlined in the Marker section, with the `CALC:MARK:Y?` command.
Preset	OFF
State Saved	The band function for each marker is saved in Instrument State.
Key Path	**Front-panel key**

The units to be used for displaying Marker Function results in Delta mode vary depending on the reference marker and what it is referenced to.

Marker Functions are different from Measurements, 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 Fctn** menu controls which marker functions are turned on and allows you to adjust setup parameters for each function. The Marker Functions are **Marker Noise**, **Band/Interval Power**, and **Band/Interval Density,** only one of which can be on for a given marker.

If the selected marker is off, pressing Marker Fctn sets it to Normal and places it at the center of the display on the trace determined by the Marker Trace rules. However, if the selected marker was **Off**, **Marker Function Off** had to be the selected function, and it remains so even after the marker is turned on, although you may then change it.

Fixed marker functions

In the case of a fixed marker, it is not possible to turn on or change a band function. This is because a Fixed marker holds the value it had when it became fixed; the trace it was on may keep on changing, so the function value, which depends on trace data, could not be calculated on an ongoing basis.

It is possible to have a Marker Function on for a Fixed marker, in the case where a function was already on when the marker became Fixed. In this case the function value will be retained in the marker. It is also possible to have a Marker Function on for a Fixed marker in the case when the marker was off and was turned on as **Fixed** because **Delta** was pressed to create a reference marker - in which case the marker function, marker function width, Y Axis value and marker function result that the **Delta** marker had when **Delta** was pressed are copied into the Fixed marker. If **Delta** is pressed again, causing the fixed reference marker to move to the delta marker's position, the marker function, marker function width, Y Axis value and marker function result that the **Delta** marker had when **Delta** was pressed are again copied into the fixed reference marker.

If a Marker Function is on for a Fixed marker, the marker's reported value is derived by the function. Therefore you cannot directly set the X or Y value of a Fixed marker which has a marker function turned on. Indirect setting as detailed above or when a Peak Search is performed is allowed, as the Fixed marker is always placed on a trace and can derive its function value from the trace at the moment when it is placed.

Interval Markers

What is an interval marker? The band power marker computes the total power within a span in a nonzero span. The results computation must include the RBW. The interval power marker measures the average power across some time interval in zero span.

Interval Density is defined to be Interval Power divided by Bn. Bn is the noise bandwidth of the RBW filter, as noted and used within the Band Power computation.

Select Marker

Refer to the Select Marker key information.

Marker Noise

Turns on the Marker Noise function for the selected marker, making it a noise marker. If the selected marker is off, it is turned on in **Normal** mode and located at the center of the screen.

When **Marker Noise** is selected while in the **Marker Function Off** state, the **Band Span** or

Interval Span is initialized to 5% of the screen width.

When **Marker Noise** is on, the marker's Y Axis Result is the average noise level, normalized to a 1 Hz noise power bandwidth, in the band specified under the **Band Adjust** key.

Example	CALC:MARK:FUNC NOIS turns on marker 1 as a noise marker. CALC:MARK:FUNC? returns the current marker function for the marker specified. In this case it returns the string: NOIS. CALC:MARK:Y? returns the y-axis value of the Marker Noise function for marker 1 (if Marker Noise is ON for marker 1). The delta value when the Y axis unit is Watt is the square of the delta value when the Y axis unit is Volt. For example, when the percent ratio with Y axis unit in Volt is 0.2, the percent ratio with Y axis unit in Watt will be 0.22 = 0.04. When you read the value out remotely you have to know whether your Y Axis Unit is log (dB), linear (V or A), or power (W).
Dependencies/Couplings	Fixed markers: It is not possible to change the Band Function for a Fixed marker; so all of the Band Function keys are grayed out for a Fixed marker. See also the Trace/Detector section. Average detector and Power Averaging auto selected when Marker Noise on. See also the Trace/Detector section. If the selected (specified) marker is off, selecting Marker Noise through the front panel or SCPI will turn the marker on.
Remote Command Notes	See the description under the **Marker Fctn** key.
Key Path	**Marker Fctn**

To guarantee accurate data for noise-like signals, a correction for the equivalent noise bandwidth is made by the analyzer. The **Marker Noise** function accuracy is best when the detector is set to Average or Sample, because neither of these detectors will peak-bias the noise. The tradeoff between sweep time and variance of the result is best when Average Type is set to Power Averaging. Therefore, Auto coupling chooses the Average detector and Power Averaging when Marker Noise is on. Though the Marker Noise function works with all settings of detector and Average Type, using the positive or negative peak detector gives less accurate measurement results.

Off-trace Markers

If a **Normal** or **Delta** noise marker is so near to the left or right edge of the trace that some of the band is off the trace, then it uses only that subset of the Band Width that is on-trace. If the marker itself is off-trace, its value becomes undefined.

Neither band/interval power nor band/interval density markers are defined if any part of the band is off-trace (unless they are Fixed with a stored function value in them), except when the edges of the bandwidth are trivially off-screen, due to mathematical limitations in the analyzer or in the controlling computer, the result will still be considered valid.

Band/Interval Power

Turns on the Band/Interval Power function for the selected marker. If the selected marker is off it is turned on in **Normal** marker and located at the center of the screen.

When **Band/Interval Power** is selected while in the **Marker Function Off** state, the **Band Span** or **Interval Span** is initialized to 5% of the screen width.

If the detector mode for the detector on the marker's trace is set to Auto, the average detector is selected. If the Average type is set to Auto, Power Averaging is selected. Other choices for the detector or Average type will usually cause measurement inaccuracy.

Example	CALC:MARK:FUNC BPOW turns on marker 1 as a band power marker. CALC:MARK2:FUNC? returns the current setting of the marker function for marker 2. In this case it returns the string: BPOW. CALC:MARK:Y? returns the y-axis value of the Band Power function for marker 1. The delta value when the Y axis unit is Watt is the square of the delta value when the Y axis unit is Volt. For example, when the percent ratio with Y axis unit in Volt is 0.2, the percent ratio with Y axis unit in Watt will be 0.22 = 0.04. When you read the value out remotely you have to know whether your Y Axis Unit is log (dB), linear (V or A), or power (W).
Dependencies/Couplings	Fixed markers: It is not possible to change the Band Function for a Fixed marker; so all of the Band Function keys are grayed out for a Fixed marker. See also the Trace/Detector section. If the detector mode for the detector on the marker's trace is set to Auto, the average detector is selected. If the Average type is set to Auto, Power Averaging is selected. See also the Trace/Detector section. If the selected (specified) marker is off, selecting Band Power through the front panel or SCPI will turn the marker on.
Remote Command Notes	See the description under the **Marker Fctn** key.
Key Path	**Marker Fctn**

Band/Interval Density

Turns on the Band/Interval Density function for the selected marker. If the selected marker is off, it is turned on in **Normal** marker mode and located at the center of the screen.

When **Band/Interval Density** is selected while in the **Marker Function Off** state, the **Band Span** or **Interval Span** is initialized to 5% of the screen width.

It may seem like the band density marker function is exactly like a function of a noise marker with variable width. But they are somewhat different. The Noise markers assume that the signal to be measured is noise-like. Based on this assumption, we can actually make reasonable measurements under very non-ideal conditions: any detector may be used, any averaging type, any VBW. In contrast, the Band Power and Band Density markers make no assumption about the statistics of the signal.

If the detector mode for the detector on the marker's trace is set to Auto, the average detector is selected. If the Average type is set to Auto, Power Averaging is selected. Other choices for the detector or Average type will usually cause measurement inaccuracy.

What is band/interval density?

On frequency domain traces, the average density across a band is the total band power divided by the bandwidth over which it is measured.

On time domain traces, interval density is the average power in the interval divided by the noise bandwidth of the RBW of the trace.

Example	CALC:MARK:FUNC BDEN turns on marker 1 as a band density marker. CALC:MARK:FUNC? returns the current setting of band function for the marker specified. In this case it returns the string: BDEN. CALC:MARK:Y? returns the y-axis value of the Band Density function for marker 1. The delta value when the Y axis unit is Watt is the square of the delta value when the Y axis unit is Volt. For example, when the percent ratio with Y axis unit in Volt is 0.2, the percent ratio with Y axis unit in Watt will be 0.22 = 0.04. When you read the value out remotely you have to know whether your Y Axis Unit is log (dB), linear (V or A), or power (W).
Dependencies/Couplings	Fixed markers: It is not possible to change the Band Function for a Fixed marker; so all of the Band Function keys are grayed out for a Fixed marker. See also the Trace/Detector section. If the detector mode for the detector on the marker's trace is set to Auto, the average detector is selected. If the Average type is set to Auto, Power Averaging is selected. See also the Trace/Detector section. If the selected (specified) marker is off, selecting Band Density through the front panel or SCPI will turn the marker on.
Remote Command Notes	See the description under the **Marker Fctn** key.
State Saved	n/a.
Key Path	**Marker Fctn**

Off

Turns off band functions for the selected marker.

Example	:CALC:MARK:FUNC OFF turns off marker functions for marker 1

Dependencies/Couplings	Fixed markers: It is not possible to change the Band Function for a Fixed marker; so all of the Band Function keys are grayed out for a Fixed marker, including Off. We could allow OFF, but it is hard to disable all but one node in a 1-of-N and still generate a –221 error. Turning off the marker function has no effect on the band span nor does it turn the marker off.
Remote Command Notes	See the description under the **Marker** key.
Key Path	**Marker, Marker Fctn**

Band Adjust

Opens a menu that lets you set the width or left or right edges of the band.

It is legal to change the width of the band even if there is no marker function on. Generally, this can only happen by sending the SCPI command since access to the menu is restricted if no marker function is on.

Dependencies/Couplings	If the marker is Fixed, Band Adjust is grayed out. If the marker function is Off, Band Adjust is grayed out. If any of the Band Adjust functions are the active function, the wings and arms of the selected marker display in green; otherwise they display in white.
Key Path	**Marker Function**

Band/Interval Span

Sets the width of the span for the selected marker.

It is legal to change the width of the band even if there is no marker function on. Generally, this can only happen by sending the SCPI command since access to the menu is restricted if no marker function is on.

In the table below, sweep_width = max(1,sweep_points–1) and sweep_points is the number of sweep points, set in the **Sweep** menu.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <freq>` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	:CALC:MARK12:FUNC:BAND:SPAN 20 MHz sets the band span of marker 12 to 20 MHz. :CALC:MARK:FUNC:BAND:SPAN? queries the band span of Marker 1.

Dependencies/Couplings	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values. Band/Interval Span is set to 0 when the marker is turned off. Band/Interval Span is set to 5% of the span when any marker function is turned on if and only if it is zero at that time.
Remote Command Notes	Sending this command selects the subopcoded marker The unit of the parameter must match the current domain of the trace the selected marker is on, or an invalid suffix error will be generated. If no unit is sent, the fundamental unit for the trace domain will be used (Hz for freq domain traces, s for time domain traces). All the values provided in this table are only valid for frequency domain traces. If the current domain of the trace is time domain, values and unit will be different. In frequency domain, the Preset value is dependant on the frequency range of the instrument. The default value 1.3245 GHz is appropriate only if the instrument is a 26.5GHz instrument (Option 526). In a 26.5GHz Instrument, the default span is 26.49 GHz, so 5% of the span corresponds to 1.3245 GHz.
Preset	If 0, Band/Interval Span is set to 5% of the span, when a marker function is turned on.
State Saved	Saved in Instrument State
Min	0 Hz
Max	Infinity
Key Path	**Marker Fctn, Band Adjust**

Band/Interval Left

Sets the left edge frequency or time for the band of the selected marker. The right edge is unaffected.

It is legal to change the width of the band even if there is no marker function on. Generally this can only happen by sending the SCPI command since access to the menu is restricted if no marker function is on.

In the table below, sweep_width = max(1,sweep_points–1) and sweep_points is the number of sweep points, set in the **Sweep** menu.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <freq>` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?`

Example	:CALC:MARK12:FUNC:BAND:LEFT 20 GHz sets the left edge of the band span of marker 12 to 20 GHz. :CALC:MARK:FUNC:BAND:LEFT? queries the band span of Marker 1.
Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Center values. Band/Interval Span is set to 0 when the marker is turned off so that means Band/Interval Left is set to the center value at this time. Band/Interval Span is set to 5% of the span when any marker function is turned on if and only if it is zero at that time.
Remote Command Notes	Sending this command selects the subopcoded marker. The unit of the parameter must match the current domain of the trace the selected marker is on, or an invalid suffix error will be generated. If no unit is sent, the fundamental unit for the trace domain will be used (Hz for freq domain traces, s for time domain traces). All the values provided in this table are only valid for frequency domain traces. If the current domain of the trace is time domain, values and unit will be different. In frequency domain, the Preset value is dependant on the frequency range of the instrument. The default value 1.3245 GHz is appropriate only if the instrument is a 26.5GHz instrument (Option 526). In a 26.5GHz Instrument, the default span is 26.49 GHz, so 5% of the span corresponds to 1.3245 GHz.
Preset	If 0, Band/Interval Span is set to 5% of the span, when a marker function is turned on, which affects Band/Interval Left
State Saved	Saved in Instrument State.
Min	0 Hz
Max	Infinity
Key Path	**Marker Fctn, Band Adjust**

Band/Interval Right

Sets the right edge frequency or time for the band of the selected marker. The left edge is unaffected.

In the table below, sweep_width = max(1,sweep_points–1) and sweep_points is the number of sweep points, set in the **Sweep** menu.

It is legal to change the width of the band even if there is no marker function on. Generally this can only happen by sending the SCPI command since access to the menu is restricted if no marker function is on.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <freq>` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	:CALC:MARK12:FUNC:BAND:RIGHt 20 GHz sets the right edge of the band span of marker 12 to 20 GHz. :CALC:MARK:FUNC:BAND:RIGHt? queries the band span of Marker 1.
Dependencies/Couplings	Changing the Band/Interval Right necessarily changes the Band/Interval Span and Band/Interval Center values. Band/Interval Span is set to 5% of span when any marker function is turned on if and only if it is zero at that time.
Remote Command Notes	Sending this command selects the subopcoded marker. The unit of the parameter must match the current domain of the trace the selected marker is on, or an invalid suffix error will be generated. If no unit is sent, the fundamental unit for the trace domain will be used (Hz for freq domain traces, s for time domain traces). All the values provided in this table are only valid for frequency domain traces. If the current domain of the trace is time domain, values and unit will be different. In frequency domain, the Preset value is dependant on the frequency range of the instrument. The default value 1.3245 GHz is appropriate only if the instrument is a 26.5GHz instrument (Option 526). In a 26.5GHz Instrument, the default span is 26.49 GHz, so 5% of the span corresponds to 1.3245 GHz.
Preset	If 0, Band/Interval Span is set to 5% of the span, when a marker function is turned on, which affects Band/Interval Right.
State Saved	Saved in Instrument State.
Min	0 Hz
Max	Infinity
Key Path	**Marker Fctn, Band Adjust**

Marker To

The Marker -> key accesses menu keys that can copy the current marker value into other instrument parameters (for example, Center Freq). The currently selected marker is made the active function on entry to this menu (if the currently selected marker is not on when you press this front panel key, it will be turned on at the center of the screen as a normal type marker and then made the active function).

The **Marker ->** (or Marker To) feature is used to quickly assign a marker's x- or y-axis value to another parameter. For example, if a marker's x-axis value is 500 MHz and y-axis value is –20 dBm, pressing **Mkr -> CF** would assign 500 MHz to **Center Freq** and pressing **Mkr ->Ref Lvl** would assign –20 dBm to **Ref Level**.

Key Path	Front-panel key

Mkr->CF

Sets the center frequency of the analyzer to the frequency of the selected marker. The marker stays at this frequency, so it moves to the center of the display. In delta marker mode, this function sets the center frequency to the x-axis value of the delta marker. When the frequency scale is in log mode, the center frequency is not at the center of the display.

If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the screen as a normal type marker.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:CENTer`
Example	CALC:MARK2:CENT sets the CF of the analyzer to the value of marker 2.
Dependencies/Couplings	This function is not available (key is grayed out) when x-axis is the time domain. All the usual couplings associated with setting the Center Frequency apply (see the Frequency Section).
Remote Command Notes	Sending this command selects the subopcoded marker. If the specified marker is off, this command will turn it on at the center of the screen as a normal type marker.
Key Path	**Marker ->**

Mkr->CF Step

Sets the center frequency (CF) step size of the analyzer to the marker frequency, or in delta-marker mode, to the frequency difference between the delta and reference markers.

If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the screen as a normal type marker.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:STEP`
Example	CALC:MARK1:STEP sets the CF step to the value (or delta value) of marker 1.
Dependencies/Couplings	This function is not available (key is grayed out) when x-axis is the time domain. All the usual couplings associated with setting CF Step apply (see the Frequency Section).
Remote Command Notes	Sending this command selects the subopcoded marker. If the specified marker is off, this command will turn it on at the center of the screen as a normal type marker.
Key Path	**Marker ->**

Mkr->Start

Changes the start frequency to the frequency of the selected marker. The marker stays at this frequency, so it moves to the left edge of the display. In delta marker mode, this function sets the start frequency to the x-axis value of the delta marker.

If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the screen as a normal type marker.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:STARt`
Example	CALC:MARK1:STAR sets the start frequency to the value (or delta value) of marker 1.
Dependencies/Couplings	This function is not available (key is grayed out) when x-axis is the time domain. All the usual couplings associated with setting the Start Frequency apply (see the Frequency Section).
Remote Command Notes	Sending this command selects the subopcoded marker. If the specified marker is off, this command will turn it on at the center of the screen as a normal type marker.
Key Path	**Marker ->**

Mkr->Stop

Changes the stop frequency to the frequency of the selected marker. The marker stays at this frequency, so it moves to the right edge of the display. In delta marker mode, this function sets the stop frequency to the x-axis value of the delta marker.

If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the screen as a normal type marker.

Remote Command	:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:STOP
Example	CALC:MARK3:STOP sets the stop frequency to the value (or delta value) of marker 3.
Dependencies/Couplings	This function is not available (key is grayed out) when x-axis is the time domain. All the usual couplings associated with setting the Stop Frequency apply (see the Frequency Section).
Remote Command Notes	Sending this command selects the subopcoded marker. If the specified marker is off, this command will turn it on at the center of the screen as a normal type marker.
Key Path	**Marker ->**

MkrΔ->Span

Sets the start and stop frequencies to the values of the delta markers. That is, it moves the lower of the two marker frequencies to the start frequency and the higher of the two marker frequencies to the stop frequency. The marker mode is unchanged and the two markers (delta and reference) end up on opposite edges of the display.

Remote Command	:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:DELTa:SPAN
Example	CALC:MARK2:DELT:SPAN sets the start and stop frequencies to the values of marker 2 and its reference marker.
Dependencies/Couplings	This function is only available when the selected marker is a delta marker. Otherwise the key is grayed out. In addition, this function is not available when the x-axis is the time domain. All the usual couplings associated with setting the Span apply (see the Span Section).
Remote Command Notes	Sending this command selects the subopcoded marker.
Key Path	**Marker ->**

MkrΔ->CF

Sets the center frequency to the frequency difference between the selected marker and its reference marker. The marker is then changed to a Normal marker and placed at the center of the span.

Remote Command	:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:DELTa:CENTer

Example	CALC:MARK2:CENT sets the CF of the analyzer to the value of marker 2.
Dependencies/Couplings	This function is only available when the selected marker is a delta marker. Otherwise the key is grayed out. In addition, this function is not available when the x-axis is the time domain.
Remote Command Notes	Sending this command selects the subopcoded marker.
Key Path	**Marker ->**

Mkr->Ref Lvl

Sets the reference level to the amplitude value of the selected marker, moving the marked point to the reference level (top line of the graticule). The marker's mode (Normal, Delta, Fixed) does not matter in this case. For example, given a delta marker, if the delta marker is the selected marker, its amplitude is applied to the reference level. If the reference marker is selected, its amplitude is applied to the reference level.

If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the screen as a normal type marker, and its amplitude applied to the reference level.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12[:SET]:RLEVel`
Example	CALC:MARK2:RLEV sets the reference level of the analyzer to the amplitude of marker 2.
Dependencies/Couplings	All the usual couplings associated with setting the Reference Level apply (see the Amplitude Section).
Remote Command Notes	Sending this command selects the subopcoded marker. If the specified marker is off, this command will turn it on at the center of the screen as a normal type marker.
Key Path	**Marker ->**

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.

Pressing the front panel Peak Search key always does a peak search. Occasionally, you may need to get to the Peak Search menu key functions without doing a peak search. You can do this by first accessing the Peak Search menu. Then go to the other menus that you need to access. Finally, you can get back to the Peak Search key menu by using the front panel Return key and pressing it as many times as required to navigate back through the previously accessed menus until you get back to the Peak Search menu.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:MARK2:MAX performs a peak search using marker 2. CALC:MARK2:Y? queries the marker amplitude (Y-axis) value for marker 2. CALC:MARK2:X? queries the marker frequency or time (X-axis) value for marker 2. SYST:ERR? can be used to query the errors to determine if a peak is found. The error –200 will be returned after an unsuccessful search.
Remote Command Notes	Sending this command selects the subopcoded marker.

Next Peak

Pressing Next Peak moves the selected marker to the peak that has the next highest amplitude less than the marker's current value. Only peaks which meet all enabled peak criteria are considered. If there is no valid peak lower than the current marker position, an error is generated and the marker is not moved.

If the selected marker was off, then it is turned on as a normal marker and a peak search is performed.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`

Example	CALC:MARK2:MAX:NEXT selects marker 2 and moves it to the peak that is closest in amplitude to the current peak, but the next lower value.
Remote Command Notes	Sending this command selects the subopcoded marker
State Saved	Not part of saved state
Key Path	**Peak Search**

Next Pk Right

Pressing Next Pk Right moves the selected marker to the nearest peak right of the current marker which meets all enabled peak criteria. If there is no valid peak to the right of the current marker position, an error is generated and the marker is not moved. If the selected marker was off, then it is turned on as a normal marker and a peak search is performed.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:MARK2:MAX:RIGH selects marker 2 and moves it to the next peak to the right of the current marker position.
Remote Command Notes	Sending this command selects the subopcoded marker.
State Saved	Not part of saved state.
Key Path	**Peak Search**

Next Pk Left

Pressing Next Pk Left moves the selected marker to the nearest peak left of the current marker which meets all enabled peak criteria. If there is no valid peak to the left of the current marker position, an error is generated and the marker is not moved. If the selected marker was off, then it is turned on as a normal marker and a peak search is performed.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:MARK2:MAX:LEFT selects marker 2 and moves it to the next peak to the left of the current marker position.
State Saved	Not part of saved state.
Key Path	**Peak Search**

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. Basically this sets the control mode for the selected marker to Delta mode. See the Marker section for the complete description of this function. The key is duplicated here in the Peak Search Menu to allow you to conveniently perform a peak search and change the marker's control mode to Delta without having to access two separate menus.

Key Path	**Peak Search or Marker**

Mkr->CF

Assigns the selected marker's frequency to the Center Frequency setting. See the Marker To section for the description of this function. The key is duplicated here in the Peak Search Menu to allow you to conveniently perform a peak search and marker to CF without having to access two separate menus.

Dependencies/Couplings	Same as specified under Marker To.
Key Path	**Peak Search or Marker ->**

Mkr->Ref Lvl

Assigns the selected marker's level to the Reference Level setting. See the Marker To section for the description of this function. The key is duplicated here in the Peak Search Menu to allow you to conveniently perform a peak search and marker to RL without having to access two separate menus.

Dependencies/Couplings	Same as specified under Marker To
Key Path	**Peak Search or Marker ->**

Peak Criteria

Pressing this key opens the Peak Criteria menu and allows you to adjust the Pk Threshold and Pk Excursion parameters used for peak search functions.

For a signal to be identified as a peak it must meet certain criteria. Signals in the negative frequency range and signals very close to 0 Hz are ignored. If either the peak excursion or peak threshold functions are on, then the signal must satisfy those criteria before being identified as a peak.

When peak excursion and peak threshold are both off:

Peak Search, Continuous Peak Search, and the maximum part of **Pk-Pk Search** will search the trace for the point with the highest y-axis value which does not violate the LO feedthrough rules. A rising and falling slope are not required for these three peak search functions.

The remaining search functions **Next Peak, Next Pk Right**, and so forth.will only consider trace points which have a rising and falling slope on the left and right respectively.

Key Path	**Peak Search**

"Peak Search" Criteria

This menu lets you decide what kind of search you want to do when the Peak Search key is pressed (or the equivalent SCPI command sent).

There are two “types” of peak search functions. One type is the “Peak Search” type, the other type is the “Next Peak” type. “Next Peak” searches (for example, Next Peak, Next Pk Left, Next Pk Right) are always checked using the Excursion and Threshold criteria as long as these criteria are On. The “Peak Search” type of search, simply finds the highest point on the trace. However you can change the “Peak Search” type of search so that it also uses the Excursion and Threshold criteria. This allows you to find the Maximum point on the trace that also obeys the Excursion and/or Threshold criteria.

When **Highest Peak** is selected, pressing **Peak Search** simply finds the highest peak on the marker’s trace. If **Same as “Next Peak” Criteria** is selected, then the search is also forced to consider the Excursion and Threshold found under the “**Next Peak” Criteria** menu.

Remote Command	`:CALCulate:MARKer:PEAK:SEARch:MODE MAXimum|PARameter`
	`:CALCulate:MARKer:PEAK:SEARch:MODE?`
Remote Command Notes	MAXimum corresponds to the **Highest Peak** setting.
	PARameter corresponds to the **Same as “Next Peak” Criteria** setting.
Preset	MAXimum
State Saved	Saved in state
Key Path	**Peak Search, Peak Criteria**

Highest Peak

When this key is selected, pressing the Peak Search key or issuing the equivalent SCPI command finds the maximum point on the trace, subject to the peak-search qualifications. This also affects the Peak Search half of Pk-Pk search and the Continuous Peak Search.

Example	CALC:MARK:PEAK:SEAR:MODE MAX
Remote Command Notes	See
Key Path	**Peak Search, Peak Criteria, “Peak Search” Criteria**

Same as “Next Peak” Criteria

When this key is selected, pressing the Peak Search key or issuing the equivalent SCPI command finds the maximum point on the trace, but subject to the Excursion and Threshold set under the Next Peak Criteria menu. The search is, of course, also subject to the peak-search qualifications. This also affects the Peak Search half of Pk-Pk search and the Continuous Peak Search.

Example	CALC:MARK:PEAK:SEAR:MODE PAR
Remote Command Notes	See
Key Path	**Peak Search, Peak Criteria, “Peak Search” Criteria**

"Next Peak" Criteria

This key opens a menu which allows you to independently set the Peak Excursion and Peak Threshold and turn them on and off.

Key Path	**Peak Search, Peak Criteria**

Pk Excursion On/Off

Turns the peak excursion requirement On/Off and sets the excursion value. The value defines the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. For example, if a value of 6 dB is selected, peak search functions like the marker Next Pk Right function move only to peaks that rise and fall 6 dB or more.

When both Pk Excursion and Pk Threshold are on, a signal must rise above the Pk Threshold value by at least the **Peak Excursion** value and then fall back from its local maximum by at least the **Peak Excursion** value to be considered a peak.

NOTE	In the event that a sequence of trace points with precisely the same values represent the maximum, the left-most point is found.

Remote Command	`:CALCulate:MARKer:PEAK:EXCursion <rel_ampl>`
	`:CALCulate:MARKer:PEAK:EXCursion?`
Example	:CALC:MARK:PEAK:EXC:STAT ON
	:CALC:MARK:PEAK:EXC 30 DB sets the minimum peak excursion requirement to 30 dB.
Dependencies/Couplings	Available only when Y axis unit is amplitude units, otherwise grayed out.
	Whenever you adjust the value of Pk Excursion (with the knob, step keys, or by completing a numeric entry), and Peak Threshold is turned ON, the Peak Threshold Line and the Peak Excursion Region are displayed.
Preset	6.0 dB
	ON
State Saved	Saved in State.
Min	0.0 dB
Max	100.0 dB
Key Path	**Peak Search, Peak Criteria, "Next Peak" Criteria**

If two signals are very close together and the peak excursion and threshold criteria are met at the outside edges of the combined signals, this function finds the highest of these two signals as a peak (or next peak). However, if a signal appears near the edge of the screen such that the full extent of either the rising or falling edge cannot be determined, and the portion that is on screen does not meet the excursion criteria, then the signal cannot be identified as a peak.

When measuring signals near the noise floor, you can reduce the excursion value even further to make these signals recognizable. To prevent the marker from identifying noise as signals, reduce the noise floor variations to a value less than the peak-excursion value by reducing the video bandwidth or by using trace averaging.

Pk Threshold On/Off

Turns the peak threshold requirement On/Off and sets the threshold value. The peak threshold value defines the minimum signal level (or min threshold) that the peak identification algorithm uses to recognize a peak.

When both Pk Excursion and Pk Threshold are on, a signal must rise above the Pk Threshold value by at least the **Peak Excursion** value and then fall back from its local maximum by at least the **Peak Excursion** value to be considered a peak.

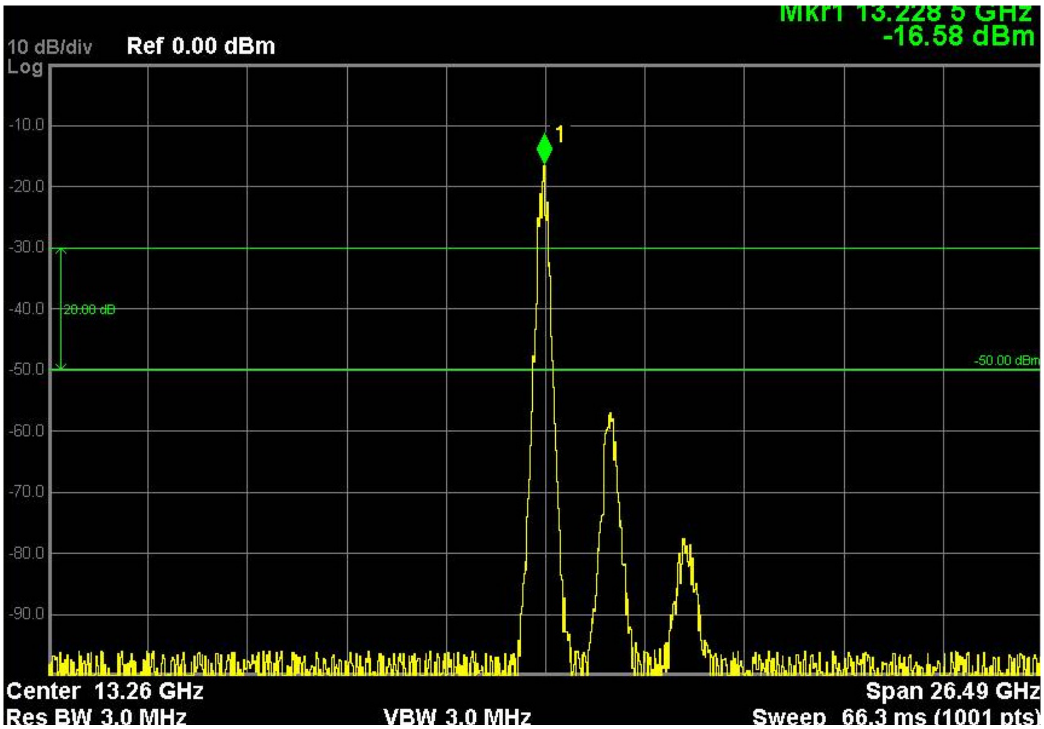
For example, if a threshold value of –90 dBm is selected, the peak search algorithm will only consider signals with amplitude greater than the –90 dBm threshold. If a threshold value of –90 dBm is selected, and **Peak Excursion** is **On** and set to 6 dB, the peak search algorithm will only consider signals with amplitude greater than the –90 dBm threshold which rise 6 dB above the threshold and then fall back to the threshold.

Remote Command	`:CALCulate:MARKer:PEAK:THReshold <ampl>` `:CALCulate:MARKer:PEAK:THReshold?`
Example	CALC:MARK:PEAK:THR:STAT ON turns on the threshold criterion. CALC:MARK:PEAK:THR –60 dBm sets the threshold to –60 dBm.
Dependencies/Couplings	When Ref Level Offset changes, Peak Threshold must change by the same amount.
Preset	–90.0 dBm ON
State Saved	Saved in State
Min	–200 dBm
Max	The current displayed Ref Level. This means the current Ref Level, offset by the Ref Level Offset.
Key Path	**Peak Search, Peak Criteria, “Next Peak Criteria”**
Default Unit	Depends on the current selected Y axis unit, see section.

Pk Threshold Line On/Off

Turns the peak threshold line on or off. Preset state is off. No equivalent SCPI command.

The Peak Threshold line is green and has the value of the peak threshold (for example, –20.3 dBm) written above its right side, above the line itself. If Peak Excursion is ON it shows on the left side as a region above the Peak Threshold line. As with all such lines (Display Line, Trigger Level line, etc) it is drawn on top of all traces.



This function is automatically set to ON (thus turning on the Peak Threshold line) whenever the value of Peak Threshold or Peak Excursion becomes the active function, unless Peak Threshold is OFF. It is automatically set to OFF whenever Peak Threshold is set to OFF. Manually turning it ON automatically turns on Pk Threshold.

The Peak Excursion part is on whenever the Pk Threshold part is on, unless Peak Excursion is OFF.

Dependencies/Couplings	If Peak Threshold is Off and the Peak Threshold line is turned On, it should turn on Peak Threshold.
Key Path	Peak Search, Peak Criteria, “Next Peak Criteria”

Peak Table

Opens the Peak Table menu.

The Peak Table provides a displayed list of up to 20 signal peaks from the selected trace. If more than one trace window is displayed, the selected trace in the selected window is used. If there are more than 20 signals which meet the peak search criteria, only the 20 highest peaks are listed.

The Peak Table is updated after each sweep. The list of peaks in the Peak Table can be ordered either by ascending frequency or by descending amplitude. In either case, the entire trace is first evaluated and the 20 highest peaks are selected for inclusion in the list. After the peaks are selected, they are then sorted and displayed according to the Peak Sort setting.

Key Path	**Peak Search**

Peak Table On/Off

Turns Peak Table On/Off. When turned On, the display is split into a measurement window and a peak table display window. Turning the Peak Table on turns the Marker Table off and vice versa.

Remote Command	`:CALCulate:MARKer:PEAK:TABLe:STATe OFF|ON|0|1`
	`:CALCulate:MARKer:PEAK:TABLe:STATe?`
Example	CALC:MARK:PEAK:TABL:STAT ON turns on and displays the peak table.
Preset	OFF
State Saved	Saved in State.
Key Path	**Peak Search, Peak Table**

Peak Sort

Sets the peak table sorting routine to list the peaks in order of descending amplitude or ascending frequency. The remote command can also be used to sort the peaks found using the :CALCulate:DATA:PEAKs command.

Remote Command	`:CALCulate:MARKer:PEAK:SORT FREQuency|AMPLitude`
	`:CALCulate:MARKer:PEAK:SORT?`
Example	CALC:MARK:PEAK:SORT AMPL sets the sorting routine to list peaks in order of descending amplitude.
	CALC:MARK:PEAK:SORT?
Preset	AMPLitude
State Saved	Saved in State.
Key Path	**Peak Search, Peak Table**

Peak Readout

Shows up to twenty signal peaks as defined by the setting:

All (ALL) - lists all the peaks defined by the peak criteria, in the current sort setting.

Above Display Line (GTDLine) - lists the peaks that are greater than the defined display line, and that meet the peak criteria. They are listed in the current sort order.

Below Display Line (LTDLine) - lists the peaks that are less than the defined display line, and that meet the peak criteria. They are listed in the current sort order.

If the peak threshold is defined and turned on, then the peaks must meet this peak criteria in addition to the display line requirements.

Remote Command	:CALCulate:MARKer:PEAK:TABLe:READout ALL|GTDLine|LTDLine :CALCulate:MARKer:PEAK:TABLe:READout?
Example	CALC:MARK:PEAK:TABL:READ GTDL
Dependencies/Couplings	Turning Display Line off forces Readout to ALL.
Preset	All
State Saved	Saved in State
Key Path	**Peak Search, Peak Table**

If the Display Line (see View/Display Section) is turned on, the Peak Table can be selected to include all peaks, only those above the Display Line, or only those below the Display Line. See Figures 1–2 and 1–3 to understand what happens if both Display Line and Pk Threshold are turned on.

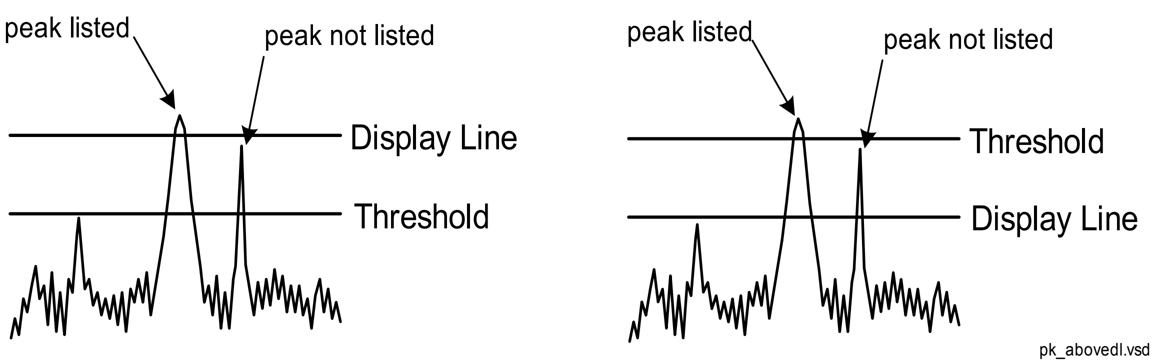


Figure 1- 2 Above Display Line Peak Identification

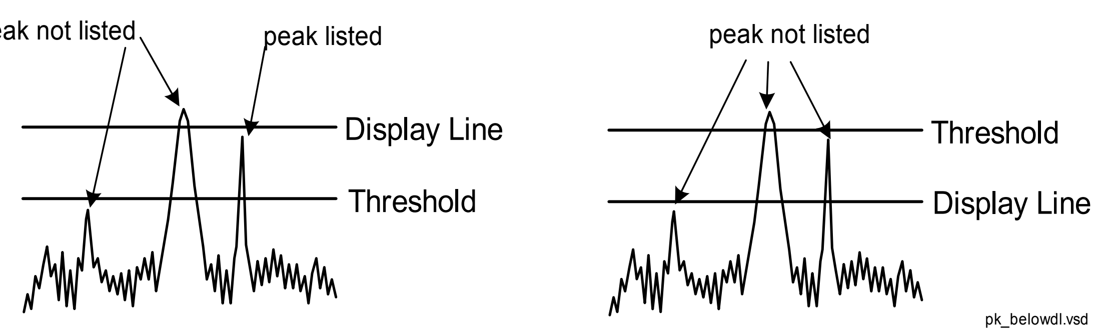


Figure 1- 3 Below Display Line Peak Identification

All

Sets the peak table to display the 20 highest peaks in the order specified by the current

Peak Sort setting. If the Peak Criteria are turned on, then only peaks that meet the defined Pk Excursion and Pk Threshold values will be found.

Example	CALC:MARK:PEAK:TABL:READ ALL
Remote Command Notes	See the **Peak Readout section**
Key Path	**Peak Search, Peak Table, Peak Readout**

Above Display Line

Sets the peak table to display only the 20 highest peaks above the display line in the order specified by the current Sort setting. If the Peak Criteria are turned on, then only peaks that meet the defined criteria will be found. If the display line is not already on, it is turned on (it has to be on or it cannot be used to exclude peaks).

Example	CALC:MARK:PEAK:TABL:READ GTDL
Remote Command Notes	See the **Peak Readout section**
Key Path	**Peak Search, Peak Table, Peak Readout**

Below Display Line

Sets the peak table to display only the 20 highest peaks below the display line as defined by the peak in the order specified by the current Sort setting. If the Peak Criteria are turned on, then only peaks that meet the defined criteria will be found. If the display line is not already on, it is turned on (it has to be on or it cannot be used to exclude peaks).

Example	CALC:MARK:PEAK:TABL:READ LTDL
Remote Command Notes	See the **Peak Readout section**
Key Path	**Peak Search, Peak Table, Peak Readout**

Continuous Peak Search On/Off

Turns Continuous Peak Search on or off. When Continuous Peak Search is on, a peak search is automatically performed for the selected marker after each sweep. The rules for finding the peak are exactly the same as for **Peak Search**, including the use of the peak criteria rules. If no valid peak is found, a warning is generated after each sweep.

When Continuous Peak Search is turned on a peak search is immediately performed and then is repeated after each sweep. If Continuous Peak Search is turned on with the selected marker off, the selected marker is set to **Normal** at the center of the screen, and then a peak search is immediately performed and subsequently repeated after each sweep.

When in Continuous Peak Search, *OPC will not return true, nor will READ or MEASure return any data, until the sweep is complete and the marker has been re-peaked. If the box is in a measurement such as averaging, and Continuous Peak Search is on, the entire measurement will be allowed to complete (for example, all the averages taken up to the average number) before the re-peak takes place, and only THEN will *OPC go true and

READ or MEASure return data.

This function is not the “Continuous Peak” function found in some other instruments. That function was designed to track the signal; this function simply does a Peak Search after each sweep.

When Continuous Peak Search is turned on for a marker, a little “hat” is placed above the marker.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPSearch[:STATe] ON|OFF|1|0` `:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPSearch[:STATe]?`
Example	CALC:MARK:CPS ON Turns on Continuous Peak Search.
Dependencies/Couplings	The Continuous Peak Search key is grayed out when the selected marker is a **Fixed** marker. Also, if Continuous Peak Search is on and the selected marker becomes a fixed marker, then Continuous Peak Search is turned off and the key grayed out. **Signal Track** and **Continuous Peak Search** are mutually exclusive so if **Signal Track** is on, **Continuous Peak Search** will be grayed out and vice versa.
Remote Command Notes	Sending this command selects the subopcoded marker.
Preset	Mode Preset
State Saved	Saved in State
Key Path	**Peak Search**
SCPI Status Bits/OPC Dependencies	The Measuring bit should remain set while this command is operating and should not go false until the marker position has been updated.

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value. It places the selected marker on the minimum value on its selected trace and places that marker’s reference marker on the peak of its selected trace. This function turns on the reference marker and sets its mode to **Fixed** if it is not already on. (These markers may be on two different traces.)

The rules for finding the maximum peak are exactly the same as for **Peak Search**, including the use of the peak criteria rules. However, the minimum trace value is not required to meet any criteria other than being the minimum y-axis value in the trace.

When Pk-Pk Search is successful, a message is displayed on the message line.

If the selected marker is off, a delta type marker is turned on and the peak-to-peak search is done. If the selected marker is on, but it is not a delta marker, then it is changed to delta which turns on the reference marker if needed, and then it performs the peak-to-peak function.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:MARK:PTP CALC:MARK:Y? queries the delta amplitude value for marker 1.
Dependencies/Couplings	Pk-Pk Search is not available (key is grayed out) when **Coupled Markers** is on. Selected marker becomes a delta marker if not already in delta mode.
Remote Command Notes	Sending this command selects the subopcoded marker.
State Saved	Not part of saved state.
Key Path	**Peak Search**

Min Search

Moves the selected marker to the minimum y-axis value on the current trace. Minimum (negative) peak searches do not have to meet the peak search criteria. It just looks for the lowest y-axis value. If the selected marker is Off, it is turned on before the minimum search is performed.

Remote Command	`:CALCulate:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:MARK:MIN selects marker 1 and moves it to the minimum amplitude value.
Remote Command Notes	Sending this command selects the subopcoded marker.
State Saved	Not part of saved state.
Key Path	**Peak Search**

Peak Data Query (SCPI Command Only)

CALC:DATA[n]:PEAK? returns a list of all the peaks for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement.

subopcode 0 is not valid for :CALCulate:DATA:PEAKs. If subopcode 0 is sent, an error is generated.

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 Peak Data Query command has four types of parameters:

- Threshold (in dBm),

- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- 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|LTDLine]]`

Example

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).

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.

Remote Command Notes	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. 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. 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. 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. 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.

5 Measurement Functions

Some of the content described in this section is not directly applicable to the 802.16 OFDMA Mode. This is common MXA 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

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

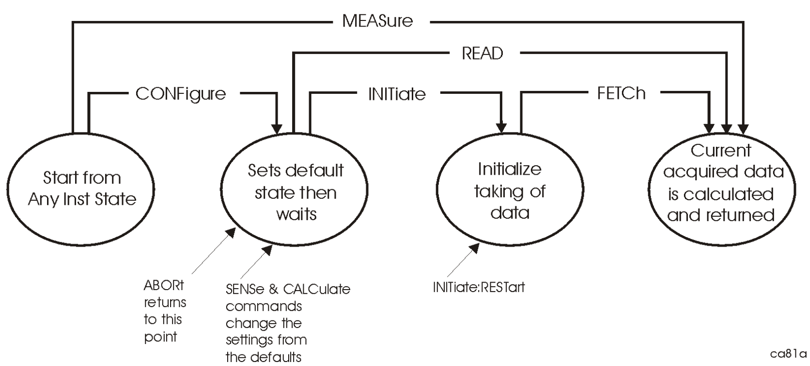


Table 5-1

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>?.

Table 5-1

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 sets the instrument to single measurement mode but should 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 Spectrum Analysis mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements. 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, e.g. 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.

Table 5-1

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.

Mode	WCDMA
Remote Command	`:CALCulate:CLIMits:FAIL?`
Range	0 | 1

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 Remote command results in each measurement section for information on the data that can be returned for each measurement.

Mode	WCDMA
Remote Command	`:CALCulate:DATA[n]? <real>,…`
Notes	The return trace depends on the measurement. In CALCulate:DATA[n], n is any valid subopcode for the current measurement.

Calculate/Compress Trace Data Query (Remote Command Only)

:CALCulate:DATA<n>:COMPress?
BLOCk | CFIT | MAXimum | MINimum | MEAN | DMEan | RMS | SAMPle | SDEViation | PPHase [,<soffset>[,<length>[,<roffset>[,<rlimit>]]]]

Returns compressed data for the specified trace data. The data is returned in the same units as the original trace and only works with the currently selected measurement. The command is used with a subopcode <*n*> since measurements usually return several types of trace data. See the following table for the subopcodes for the trace data names that are available in each measurement. For subopcodes that return scalar data use the `:CALCulate:DATA[n]?` command above.

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.

- 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.

- 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).

MAX, MEAN, MIN, 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 regions you specify (using <rlimit>) ignoring any data beyond that.

- MAXimum - returns the maximum data point 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 the arithmetic mean of the data point values for the specified region(s) of trace data. See “Mean Value of I/Q Data Points for Specified Region(s)” on page 376. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See “Mean Value of I/Q Data Pairs for Specified Region(s)” on page 376.

  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.

Equation 5-1 Mean Value of I/Q Data Points for Specified Region(s)

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

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)

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

where |Xi| is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- MINimum - returns the minimum data point for the specified region(s) of trace data For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- RMS - returns the arithmetic rms of the data point values for the specified region(s) of trace data. See “RMS Value of Data Points for Specified Region(s)” on page 377.

  For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See “RMS Value of I/Q Data Pairs for Specified Region(s)” on page 377.

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)

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

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)

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

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 I/Q trace data, you may want to calculate the mean power. You must convert this rms I/Q value (peak volts) to power in dB.

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPle - returns the first data value for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See “Standard Deviation of Data Point Values for Specified Region(s)” on page 377.

  For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See “Standard Deviation of I/Q Data Pair Values for Specified Region(s)” on page 377.

Equation 5-5 Standard Deviation of Data Point Values for Specified Region(s)

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

where Xi is a data point value, X is the arithmetic mean of the data point values for the specified region(s), and n is the number of data points in the specified region(s).

Equation 5-6 Standard Deviation of I/Q Data Pair Values for Specified

$$\textbf{Region(s)}\,\mathrm{SDEV} = \sqrt{\frac{1}{n} \sum_{Xi \in \text{region(s)}} (|Xi| - \bar{X})^2}$$

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).

- PPH - returns the pairs of 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.
  Assuming this command can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPH.

  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) =

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

  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:

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

  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 5-2 **Sample Trace Data - Constant Envelope**

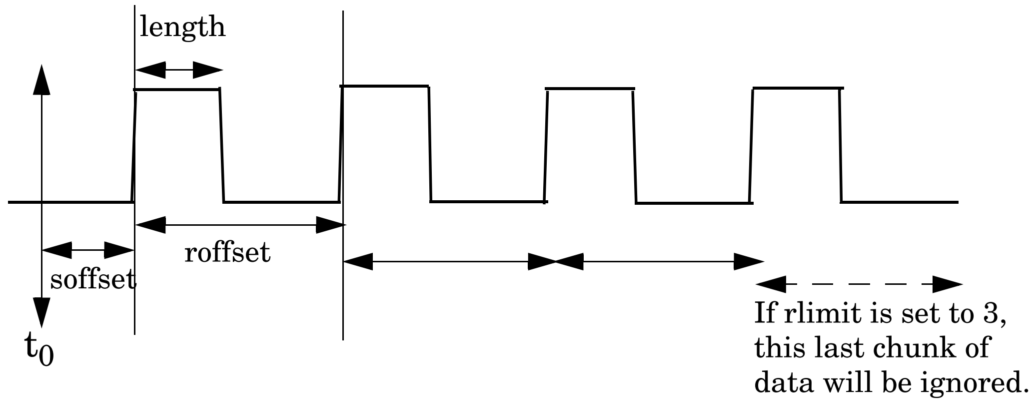
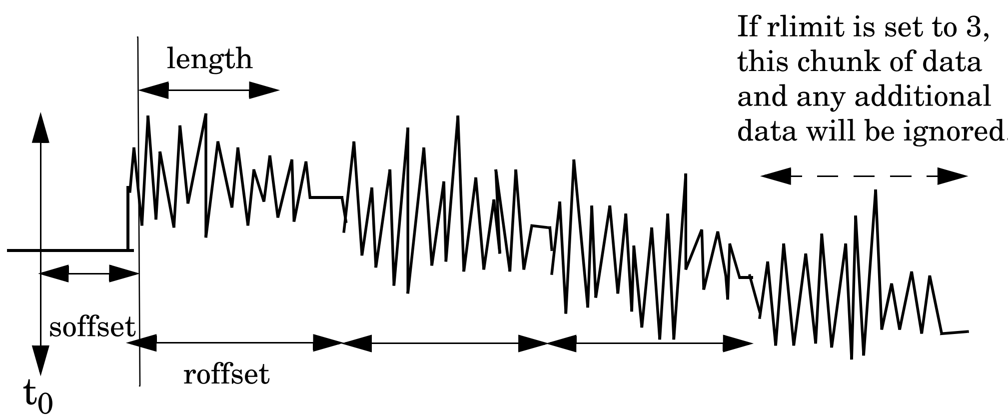


Figure 5-3 **Sample Trace Data - Not Constant Envelope**



<soffset> - start offset is an optional real number (in seconds). 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 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 (in seconds). 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 (in seconds). 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.

<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.

Example: To query the mean power of a set of GSM bursts:

1. Set the waveform measurement sweep time to acquire at least one burst.
2. Set the triggers such that acquisition happens at a known position relative to a

burst.

3. 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.)

Remarks: The optional parameters must be entered in the specified order. For example, if you want to specify <length>, you must also specify <soffset>.

This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.

Calculate peaks of trace data (Remote Command Only)

Returns a list of peaks for the designated trace data n for the currently selected measurement. The peaks must meet the requirements of the peak threshold and excursion values. The command can only be used with specific [n] (subopcode) values, for measurement results that are trace, or scalar, data. See the remote command section of each measurement for the appropriate subopcodes. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. subopcode n=0, is the raw trace data which cannot be searched for peaks. subopcode n=1, is the scaler data which also cannot be searched for peaks.

Mode	WCDMA
Remote Command	`:CALCulate:DATA[n]:PEAKs?` `<threshold>,<excursion>[,AMPLitude|FREQuency|TIME]`
Notes	The return trace depends on the measurement.

Meas Setup

The Meas Setup key displays the menu keys that allow you to control the parameters for the current measurement. Descriptions and remote commands for these keys are located under the specific section for the measurement of interest.

Key Path	**Front-Panel key**

Mode

Modes, also known as applications in MXA, are a collection of measurement capabilities packaged together to provide you with a personality specific to your measurement needs. In MXA, each mode has a Model Number and is an individually licensed application.

NOTE	To change Modes, when you are consulting Help in the analyzer, you must first exit Help (by pressing the Cancel (Esc) key) and then select the mode of interest.

When viewing Help for modes, note the following:

NOTE	You cannot get help for the current mode by pressing one of the mode softkeys. Each mode is described below.

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

Mode	All
Remote Command	`:INSTrument[:SELect] SA|BASIC|WCDMA|` WiMAX OFDMA `: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 PD for 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 instrument state.
Key Path	**Mode**

Activates a menu for selection of the measurement mode of the analyzer. The default measurement mode is the 1st listing in the menu. Only licensed and installed measurement modes are displayed.

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.

Mode	All
Example	:INST 'SA'
Remote Command Notes	NOTE: The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above. The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.

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 value	:INSTrument[:SELect] parameter
Spectrum Analyzer	1	SA
WCDMA	9	WCDMA
I/Q Analyzer (Basic)	8	BASIC
Wimax OFDMA	75	WiMAX OFDMA

Mode	All
Remote Command	`:INSTrument:NSELect <integer>` `:INSTrument:NSELect?`
Example	:INST:NSEL 1
Remote Command Notes	SA mode is 1 The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
Preset	Not affected by Preset. Set to default mode (1 for MXA) following Restore System Defaults.
State Saved	Saved in instrument 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.

Mode	All
Remote 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 is defined here.

Current Application Model

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

Mode	All
Remote 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 per se, value will be the selected application when Save is invoked

Current Application Revision

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

Mode	All
Remote 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) The format is Major.Minor.Build.Compile, where Major must correspond to the Integer portion of the Version in the license file for the application.
Preset	Not affected by Preset
State Saved	Not saved in state per se, value will be the selected application when Save is invoked

Current Application Options

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

Mode	All
Remote Command	`:SYSTem:APPLication[:CURRent]:OPTion?`
Example	:SYST:APPL:OPT?
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

Application Identification Catalog (Remote commands only)

Application Catalog number of entries

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

Mode	All
Remote 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).

Mode	All
Remote 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" String length is COUNt * 7 – 1. (7 = Model Number length + 1 for comma. –1 = no comma for the 1st entry.)
Preset	Not affected by Preset
State Saved	Not saved in state.

Application Catalog Revision

Returns the Revision of the provided Model Number.

Mode	All
Remote 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" 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.

Application Catalog Options

Returns a list of Options for the provided Model Number

Mode	All
Remote 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 tasks, including power and demod measurements.

Key Path	**Mode**
Example	`INST:SEL SA` `INST:NSEL 1`

IQ Analyzer (Basic)

Selects the IQ Analyzer mode. The measurements available in this mode are Complex Spectrum and Waveform.

Key Path	**Mode**
Example	`INST:SEL BASIC` `INST:NSEL 8`

W-CDMA with HSDPA/HSUPA

Selects the W-CDMA with HSDPA/HSUPA mode for general purpose measurements. There are several measurements available in this mode.

Key Path	**Mode**
Example	`INST:SEL WCDMA` `INST:NSEL 9`

802.16 OFDMA (WiMAX/WiBro)

Selects the WiMAX-OFDMA mode for general purpose measurements. There are several measurements available in this mode.

Key Path	**Mode**
Example	`INST:SEL  WiMAX OFDMA` `INST:NSEL 75`

Mode Setup

Key Path	**Front Panel**

Radio Standard

The following standards for WiMAX are supported:

IEEE 802.16e–2005

WiBro (Korean mobile WiMAX-OFDMA service

Mode	WiMAX OFDMA
Key Path	**Mode Setup, Radio**
Remote Command	`[:SENSe]:RADio:STANdard WM80216E05|WIBRO`
	`[:SENSe]:RADio:STANdard?`
Preset	WM80216E05
State Saved	Saved in instrument state.
Range	IEEE 802.16e–2005 | WiBro
Example	RAD:STAN WIBRO
	RAD:STAN?

Device

Allows you to specify the device to be used.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup**
Remote Command:	`[:SENSe]:RADio:STANdard:DEVice BTS|MS`
	`[:SENSe]:RADio:STANdard:DEVice?`
Preset:	BTS
State Saved:	Saved in instrument state.
Range:	BS | MS
Remote Command Notes:	Radio device BTS is called BS in the WiMAX-OFDMA mode. BS is used in front panel and BTS is used for remote command.

Example:	:RAD:STAN:DEV BTS :RAD:STAN:DEV?

Preset Profile

802.16e–2005 mode

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:Y05[:PROFile] B1M25|B3M5|B5M|B7M|B8M75|B10M|B14M|B15M|B17M5|B20M|B28M` `[:SENSe]:RADio:STANdard:Y05[:PROFile]?`
Preset:	B10M (802.16e–2005 mode)
State Saved:	Saved in instrument state.
Range:	1.25MHz | 3.5MHz | 5MHz | 7MHz | 8.75MHz | 10MHz | 14MHz | 15MHz | 17.5MHz | 20MHz | 28MHz
Example:	:RAD:STAN:Y05 B10M :RAD:STAN:Y05?

WiBro mode

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std, WiBro**
Remote Command:	`[:SENSe]:RADio:STANdard:WIBRo[:PROFile] B4M375|B8M75|B17M5` `[:SENSe]:RADio:STANdard:WIBRo[:PROFile]?`
Preset:	B8M75
State Saved:	Saved in instrument state.
Range:	4.375MHz | 8.75MHz | 17.5MHz
Example:	:RAD:STAN:WIBR B8M75 :RAD:STAN:WIBR?

FFT Size

OFDMA supports a scalable frame structure where the FFT size scales with bandwidth to keep subcarrier spacing fixed. Four FFT "NFFT" sizes are specified by the OFDMA standard: 128, 512, 1024 and 2048.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:NFFT <integer>` `[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:NFFT?`
Preset:	1024
State Saved:	Saved in instrument state.
Range:	128, 512, 1024, 2048
Example:	RAD:STAN:BAND:CONF:NFFT 1024 RAD:STAN:BAND:CONF:NFFT?

BW Ratio

BW Ratio is defined as the ratio between the OFDMA FFT sample rate and the nominal channel bandwidth. The 802.16 Standard specifies that the BW Ratio be set to 8/7 or 28/25 depending on the nominal bandwidth of the test signal.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:BWRatio R8BY7|R28BY25` `[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:BWRatio?`
Preset:	R28BY25
State Saved:	Saved in instrument state.
Range:	8/7|28/25
Remote Command Notes:	Force Restart is unavailable when WiBro is selected as the Radio Standard
Example:	:RAD:STAN:GINT:RAT R1BY8 :RAD:STAN:GINT:RAT?

Guard Interval

IEEE 802.16 OFDMA supports multiple Guard Interval implementations. Each measurement changes its defaults according to the selected standard or device, if necessary.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:GINTerval:RATio R1BY32|R1BY16|R1BY8|R1BY4` `[:SENSe]:RADio:STANdard:GINTerval:RATio?`
Preset:	R1BY8
State Saved:	Saved in instrument state.
Range:	1/32 | 1/16 | 1/8 | 1/4
Dependencies/Couplings:	Radio Standard or Radio Device preset this to default.
Remote Command Notes:	Force Restart is unavailable when WiBro is selected as the Radio Standard (described in Radio Standard)).
Example:	:RAD:STAN:GINT:RAT R1BY8 :RAD:STAN:GINT:RAT?

Frame Duration

The Frame Duration parameter specifies OFDMA frame duration in units of time.

You can use the Radio Standard or Radio Device preset to set the Frame Duration to a value specified in the OFDMA standard or you can specify an arbitrary value manually in the Frame Duration parameter.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:FDURation <time>` `[:SENSe]:RADio:STANdard:FDURation`
Preset:	5.0 ms
State Saved:	Saved in instrument state.
Min:	2 ms
Max:	20 ms
Dependencies/Couplings:	Radio Standard or Radio Device preset this parameter to the default length value.
Restriction and Notes:	The Actual Frame Duration value is selected that is closest in value to one of the following discrete numbers: 2, 2.5, 4, 5, 8, 10, 12.5, 20 ms.

Example:	RAD:STAN:FDUR 5 RAD:STAN:FDUR?

Downlink Ratio

Downlink Ratio, expressed as a percentage, is the ratio of the downlink subframe length (including the TTG) to the frame length. Downlink Ratio defines where the uplink subframe starts relative to the start of the frame. A 30% Downlink Ratio means that 30% of the frame length is downlink subframe and 70% is uplink subframe.

Mode:	WiMAX OFDMA
Key Path:	**Mode Setup, Radio Std**
Remote Command:	`[:SENSe]:RADio:STANdard:DRATio <real>` `[:SENSe]:RADio:STANdard:DRATio`
Preset:	50.0 %
State Saved:	Saved in instrument state.
Min:	0 %
Max:	100 %
Dependencies/Couplings:	Radio Standard or Radio Device preset this parameter to the default length value.
Example:	RAD:STAN:DRAT 50.0 RAD:STAN:DRAT?

Remote Only Commands

Nominal Bandwidth

The Nominal Bandwidth parameter specifies the nominal channel bandwidth. OFDMA supports a scalable frame structure where the FFT size scales according to the bandwidth to keep subcarrier spacing fixed. The OFDMA standard specifies four FFT "NFFT" sizes" (128, 512, 1024 and 2048) and, in addition, supports many nominal bandwidths. You can use the Preset to Standard to set the Nominal Bandwidth to a standard default value or you can specify an arbitrary value with this command.

How the analyzer determines Nominal Bandwidth

The IEEE 802.16e–2005 standard defines the Sampling Frequency (Fs) as:

Fs = floor(BWRatio*BW/8000)*8000

This is the sample rate for a non-oversampled OFDMA signal. This equation restricts the sampling frequency to 8 kHz increments. To facilitate R&D development and debug-mode analysis of an OFDMA DUT, the analyzer allows arbitrary Sampling Frequency. To implement this capability, the analyzer does not use the "floor" function to compute the Sampling Frequency, but instead uses the following formula:

Nominal BW (analyzer) = Fs / BWRatio

This functionality is only available with SCPI control and is recommended only for the advanced user.

Mode:	WiMAX OFDMA
Remote Command:	`[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:VALue <freq>` `[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:VALue?`
Preset:	10 MHz
State Saved:	Saved in instrument state.
Min:	31.25 kHz
Max:	200 MHz
Example:	RAD:STAN:BAND:CONF:VAL 9.996 MHz RAD:STAN:BAND:CONF:VAL?

BW Ratio – Fractional Number

The BW Ratio is defined as the ratio between the OFDMA FFT sample rate and the nominal channel bandwidth.

This parameter is represented as a fractional number that contains two values; the first value is the numerator and the second is the denominator value of the BW Ratio.

This functionality is only available with SCPI control and is recommended only for the advanced user.

Mode:	WiMAX OFDMA
Remote Command:	`[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:BWRatio:FRACtion <integer>, <integer>` `[:SENSe]:RADio:STANdard:BANDwidth[:CONFigure]:BWRatio:FRACtion?`
Preset:	28,25
State Saved:	Saved in instrument state.
Min:	1
Max:	1000

Restriction and Notes:	SCPI Only. No front panel Access. The value of this fraction should be between 1.0 to 2.0
Example:	RAD:STAN:BAND:CONF:BWR:FRAC 11,10 RAD:STAN:BAND:CONF:BWR:FRAC?

Guard Interval – Fractional Number

IEEE 802.16 OFDMA supports multiple Guard Interval implementations. Each measurement changes its defaults according to the selected standard or device, if necessary. For advanced user, the Guard Interval can be set to a value other than the standard values (1/4, 1/8, 1/16 or 1/32).

This parameter is represented as a fractional number that contains two values; the first value is the numerator and the second is the denominator value of the Guard Interval.

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NOTE: This functionality is only available with SCPI control and is recommended only for the advanced user.

Mode:	WiMAX OFDMA
Remote Command:	`[:SENSe]:RADio:STANdard:GINTerval:RATio:FRACtion <integer>, <integer>` `[:SENSe]:RADio:STANdard:GINTerval:RATio:FRACtion?`
Preset:	1, 8
State Saved:	Saved in instrument state.
Min:	0
Max:	1000
Restriction and Notes:	SCPI Only. No front panel Access. The value of this fraction should be between 0.0 to 1.0
Example:	RAD:STAN:GINT:RAT:FRAC 3,18 RAD:STAN:GINT:RAT:FRAC?

Sweep/Control

This section describes the keys in the Sweep, Control and Capture menu that are applicable to the Swept SA measurement. It also describes the Restart, Single, and Cont key functions that control the data acquisition of the instrument.

Meas Uncal 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	Front-panel key

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Note that 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.

In FFT spans, you cannot control the sweep time, it is set by the analyzer based on an estimate of the time required to make FFT measurements.

Sweep time is coupled to RBW and VBW, and is impacted by the number of sweep points. So changing those parameters may change the sweep time. The Auto/Man line on this key disappears when in Zero Span. This is because there is no “Auto Sweep Time” when in zero span.

The Auto/Man line also disappears when in an FFT sweep. In this case, the key is grayed out. The approximate sweep time is calculated and displayed on the key.

See table below for more detail.

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

Example	SWE:TIME 500 ms SWE:TIME:AUTO OFF

Dependencies/Couplings	The third line of the softkey (Auto/Man) disappears in Zero Span. The SCPI command :SWEep:TIME:AUTO ON if sent in Zero Span it generates an error message. Softkey grayed out and third line of the softkey (Auto/Man) disappears in FFT sweeps. Pressing the key or sending the SCPI for sweep time while the instrument is in FFT sweep generates a –221, "Settings Conflict;" error. The SCPI command :SWEep:TIME:AUTO ON if sent in FFT sweeps generates an error. Key is grayed out in Measurements that don't support swept mode. Key is blanked in Modes that don't support swept mode. Set to Auto when Auto Couple is pressed or sent remotely. The Sweep Time used upon entry to Zero Span is simply the same as the Sweep Time which was in effect before entering Zero Span. The Sweep Time can be changed while in Zero Span. Upon leaving Zero Span, the Auto/Man state of Sweep Time which existed before entering Zero Span is restored. If Sweep Time was in Auto before entering Zero Span, or if it is set to Auto while in zero span (which can happen through remote command or if **Auto Couple** is pressed) it returns to Auto and recouples when returning to non-zero spans. If Sweep Time was in Man before entering Zero Span, it returns to Man when returning to non-zero spans, and any changes to Sweep Time which were made while in Zero Span are retained in the non-zero span (except where constrained by minimum limits, which are different in and out of zero span).
Remote Command Notes	The values shown in this table reflect the "swept spans" conditions which are the default settings after a preset. See "Couplings" for values in the zero span domain.
Preset	The preset Sweep Time value is hardware dependent since Sweep Time presets to Auto. Therefore the above number is meaningless.
State Saved	Saved in State.
Min	In zero span: 1 μs In swept spans: 1 ms
Max	In zero span: 6000s In swept spans: 4000s
Key Path	**Sweep/Control**
SCPI Status Bits/OPC Dependencies	Meas Uncal is Bit 0 in the STATus:QUEStionable:INTegrity:UNCalibrated register

Pause/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 from the point it was at when paused.

Remote Command	`:INITiate:PAUSe`
Example	:INIT:PAUS
Dependencies/Couplings	Unavailable (grayed out) in measurements that do not support Pausing. Blanked in modes that do not support Pausing.
Key Path	**Sweep/Control**

Remote Command	`:INITiate:RESume`
Example	:INIT:RESU
Dependencies/Couplings	Unavailable (grayed out) in measurements that do not support Pausing. Blanked in modes that do not support Pausing.
Key Path	**Sweep/Control**

Sweep Setup

Lets you set the sweep functions that control features such as sweep type and time.

Dependencies/Couplings	The whole Sweep Setup menu is grayed out in Zero Span, however the menus under Sweep Setup can be changed remotely with no error indication. Grayed out in measurements that do not support swept mode. Blanked in modes that do not support swept mode
Key Path	**Sweep/Control**

Sweep Time Rules

Allows the choice of three distinct sets of sweep time rules. These are the rules that are used to set the sweep time when **Sweep Time** is in **Auto.** These rules only apply when in the Swept **Sweep Type** (either manually or automatically chosen) and not when in FFT sweeps.

The first set of rules is called **SA – Normal**. **Sweep Time Rules** is set to **SA-Normal** on a **Preset** or **Auto Couple**. These rules give optimal sweep times at the cost of a bit of accuracy. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Setting **Sweep Time Rules** to **SA-Accuracy** will result in slower sweep times than **SA-Normal**, usually about three times as long, but better amplitude accuracy for CW signals. The instrument absolute amplitude accuracy specifications only apply when **Sweep Time** is set to **Auto**, and **Sweep Time Rules** are set to **SA-Accuracy**. Additional amplitude errors which occur when **Sweep Time Rules** are set to **SA-Normal** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **SA-Normal** is the preferred setting of **Sweep Time Rules**.

The third set of sweep times rules is called **Stimulus/Response** and is automatically selected when an integrated source is turned on, such as a Tracking Generator or a synchronized external source. The sweep times for this set of rules are usually much faster for swept-response measurements. Stimulus-response auto-coupled sweep times are typically valid in stimulus-response measurements when the system's frequency span is less than 20 times the bandwidth of the device under test. You can select these rules manually (even if not making Stimulus-Response measurements) to get faster sweeps without the "Meas Uncal" warning. but you are then not protected from the oversweep condition and may end up with uncalibrated results. However, it is commonplace in measuring non-CW signals such as noise to be able to get excellent measurement accuracy at sweep rates higher than those required for CW signal accuracy, so this is a valid measurement technique.

Remote Command	`[:SENSe]:SWEep:TIME:AUTO:RULes NORMal|ACCuracy|SRESponse` `[:SENSe]:SWEep:TIME:AUTO:RULes?`
Example	SWE:TIME:AUTO:RUL ACC
Dependencies/Couplings	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out), however its settings can be changed remotely with no error indication. Grayed out in FFT sweeps. Pressing the key while the instrument is in FFT sweep generates an advisory message. The SCPI is acted upon if sent, but will have no effect other than to change the readout on the key, as long as the analyzer is in an FFT sweep. Set to Auto on Auto Couple.
Preset	AUTO
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup**

Auto

Sets the analyzer to automatically choose Sweep Time Rules.

Remote Command	`[:SENSe]:SWEep:TIME:AUTO:RULes:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:SWEep:TIME:AUTO:RULes:AUTO[:STATe]?`
Example	:SWE:TIME:AUTO:RUL:AUTO ON

Dependencies/Couplings	Set on Preset or Auto Couple.
Preset	ON
Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**

SA - Normal

Chooses Sweep Time Auto Rules for optimal speed and generally sufficient accuracy.

Example	:SWE:TIME:AUTO:RUL NORM
Dependencies/Couplings	Automatically selected unless Source is on. If directly selected sets AUTO to Off.
Remote Command Notes	See Sweep Time Rules.
Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**

SA - Accuracy

Chooses Sweep Time Auto Rules for specified absolute amplitude accuracy.

Example	:SWE:TIME:AUTO:RUL ACC
Dependencies/Couplings	If directly selected sets AUTO to Off. See Sweep Time Rules. Do not allow sweep time to fall below 20 ms when in SA - Accuracy
Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**

Stimulus/Response

Chooses Sweep Time Auto Rules for use with a source.

Example	:SWE:TIME:AUTO:RUL SRES
Dependencies/Couplings	Automatically selected when Source is on May not be available when in an FFT sweep. If directly selected, sets AUTO to Off.
Remote Command Notes	See Sweep Time Rules.
Key Path	**Sweep/Control, Sweep Setup, Sweep Time Rules**

Sweep Type

Chooses between the FFT and Sweep types of sweep.

Sweep Type refers to whether or not the instrument is in Swept or FFT analysis. When in Auto, the selection of sweep type is governed by two different sets of rules, depending on whether you want to optimize for dynamic range or for speed.

This function is irrelevant in zero span, because in zero span the instrument is not sweeping.

Remote Command	`[:SENSe]:SWEep:TYPE FFT|SWEep`
	`[:SENSe]:SWEep:TYPE?`
Dependencies/Couplings	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out), however its settings can be changed remotely with no error indication.
Preset	AUTO
Key Path	**Sweep/Control, Sweep Setup**

Auto

When in Auto, the selection of sweep type is governed by two different sets of rules, depending on whether you want to optimize for dynamic range or for speed. These rules are chosen under the **Sweep Type Rules** key.

Remote Command	`[:SENSe]:SWEep:TYPE:AUTO OFF|ON|0|1`
	`[:SENSe]:SWEep:TYPE:AUTO?`
Example	:SWE:TYPE:AUTO ON
Dependencies/Couplings	Pressing Auto Couple always sets Sweep Type to Auto.
Preset	ON
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type**

Swept

Manually selects swept analysis, so it cannot change automatically to FFT.

Example	SWE:TYPE SWE
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type**

FFT

Manually selects FFT analysis, so it cannot change automatically to Swept.

Example	SWE:TYPE FFT

Dependencies/Couplings	If Manual FFT is selected, the Signal ID key is grayed out. When Signal ID is on, Manual FFT is grayed out. For both the dynamic range case and the speed case, swept is chosen whenever any form of Signal ID is on.
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type**

Sweep Type Rules

Selects which set of rules will be used for automatically choosing the Sweep Type when Sweep Type is in Auto.

Remote Command	`[:SENSe]:SWEep:TYPE:AUTO:RULes SPEed|DRANge` `[:SENSe]:SWEep:TYPE:AUTO:RULes?`
Dependencies/Couplings	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out), however its settings can be changed remotely with no error indication.
Preset	DRANge
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup**

Auto

This selection is automatically chosen when Auto Couple is pressed. When in Auto, the Sweep Type Rules are simply set to Best Dynamic Range. It seems like a very simple Auto function, but the use of this construct allows a consistent statement about what the Auto Couple key does.

Remote Command	`[:SENSe]:SWEep:TYPE:AUTO:RULes:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:SWEep:TYPE:AUTO:RULes:AUTO[:STATe]?`
Example	:SWE:TYPE:AUTO:RUL:AUTO ON
Dependencies/Couplings	Pressing Auto Couple always sets Sweep Type Rules to Auto.
Preset	ON
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**

Best Dynamic Range

This selection tells the analyzer to choose between swept and FFT analysis with the primary goal of optimizing dynamic range. If the dynamic range is very close between swept and FFT, then it chooses the faster one. This auto selection also depends on RBW

Type.

In determining the Swept/FFT setting the auto rules use the following approach:

If the RBW Filter Type is Gaussian use the RBW for the Normal Filter BW and if that RBW > 210 Hz, use swept; for RBW <= 210 Hz, use FFT.

If the RBW Filter Type is Flat Top, use the same algorithm, but use 420 Hz instead of 210 Hz for the transition point between Swept and FFT.

If the RBW Filter Type is CISPR/MIL, always use Swept.

Example	SWE:TYPE:AUTO:RUL DRAN sets the auto rules to dynamic range.
Dependencies/Couplings	Directly selecting this setting sets AUTO to OFF.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**

Best Speed

Selecting Best Speed tells the analyzer to choose between FFT or swept analysis based on the fastest analyzer speed.

Example	SWE:TYPE:AUTO:RUL SPE sets the rules for the auto mode to speed
Dependencies/Couplings	Directly selecting this setting sets AUTO to OFF.
Key Path	**Sweep/Control, Sweep Setup, Sweep Type Rules**

FFT Width

This menu displays and controls the width of the FFT's performed while in FFT mode.

Remote Command	`[:SENSe]:SWEep:FFT:WIDTh <real>`
	`[:SENSe]:SWEep:FFT:WIDTh?`
Example	SWE:FFT:WIDT 167 kHz sets this function to "<167.4 kHz"
Dependencies/Couplings	In Zero Span, this key is irrelevant and cannot be accessed (because the whole Sweep Setup menu is grayed out). However, its settings can be changed remotely with no error indication.

Remote Command Notes	The parameter is in units of frequency; the setting is chosen that is closest to the sent parameter. For example, 8 MHz would select ~7.99 MHz whereas 5 kHz would select <4.01 kHz. The readback is the number that was chosen not the number that was sent; for example, 4.01 E+3 or 25 E+6. For the last key, ~Maximum, the value that will get used is option dependant. Normally, it will be equivalent to ~10 MHz but with the wide bandwidth option installed it will be equivalent to ~25 MHz. Any value sent from SCPI 10 MHz or greater will select ~Maximum. For example, if 11 MHz is sent it will select ~Maximum even though 8 MHz is closer to 11 MHz than 25 MHz.
Preset	The Preset is Auto, but Preset will also pick Best Dynamic Range and this function will be set to ~Maximum
State Saved	Saved in Instrument State.
Key Path	**Sweep/Control, Sweep Setup**

Remote Command	`[:SENSe]:SWEep:FFT:WIDTh:AUTO OFF|ON|0|1` `[:SENSe]:SWEep:FFT:WIDTh:AUTO?`
Example	:SWE:FFT:WIDT:AUTO ON
Dependencies/Couplings	Pressing Auto Couple always sets FFT Width to Auto.
Preset	ON
State Saved	Saved in instrument state.
Key Path	**Sweep/Control, Sweep Setup**

Points

Sets the number of points per sweep, from 1 to 20001. By selecting a number of sweep points greater than 1001 you are optimizing the frequency resolution and accuracy while accepting a reduced measurement speed. In addition to sweep points, the span, resolution bandwidth, video bandwidth, average detection and center frequency will also affect measurement speed.

When in a split screen display each window may have its own value for points.

Remote Command	`[:SENSe]:SWEep:POINts <integer>` `[:SENSe]:SWEep:POINts?`
Example	SWE:POIN 501 SWE:POIN?

Dependencies/Couplings	Grayed out in measurements that don’t support swept Blanked in modes that don’t support swept. Will be affected by: log sweep Whenever the number of sweep points change: All trace data is erased Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) Sweep time is re-quantized Any limit lines that are on will be updated If averaging/hold is on, averaging/hold starts over
Preset	1001
State Saved	Saved in instrument state.
Min	1
Max	20001
Key Path	**Sweep**

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements.

The Restart function is accessed in several ways:

Pressing the Restart key

sending the remote command INIT:IMMediate

sending the remote command INIT:RESTart

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). 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.

Remote Command	`:INITiate[:IMMediate]`
Example	:INIT:IMM
Dependencies/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.
Key Path	Front-panel key

Remote Command	`:INITiate:RESTart`
Example	:INIT:REST

Dependencies/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.

Single/Cont key (Continuous Measurement)

The **Single** key sets the analyzer for single measurement operation.

The **Cont** key sets the analyzer for Continuous measurement operation. Pressing this key is equivalent to sending the remote command INIT:CONT ON.

In Spectrum Analysis Mode:

The analyzer takes repetitive sweeps, averages, measurements, and so forth 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 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 set for a Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

The INIT:CONT 1 command has no effect

The INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until k=N, at which point the current sequence will stop and the instrument will go to the idle state.

Remote Command	`:INITiate:CONTinuous OFF|ON|0|1`
	`:INITiate:CONTinuous?`
Example	:INIT:CONT 0 puts analyzer in Single measurement operation.
	:INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON
	(Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in Instrument State.
Key Path	Front-panel key

Abort (Remote 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 an idle state until an :INIT:IMM command is received.

Remote 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.

Trigger

The Trig key accesses the **Trigger** menu which contains keys to control the 1-of-N selection of the Trigger source.

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 when 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 as desired. Each source's trigger settings (for example, level, delay and slope) are the same for the **Trigger** 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 the Sync Source menus. For this reason, the only SCPI node that exists for the settings is the :TRIGger[:SEQuence] menu.

The trigger settings are common to all applications (modes). However, each application may have its own ranges and default value settings. Also, some applications may have trigger features that are unavailable because they do not make sense for that particular application.

The trigger source, on the other hand, is uniquely selected for each measurement. The trigger source setting is the only trigger parameter that is measurement dependent.

The syntax of all the Trigger SCPI commands described in this section will be the same for every measurement in all of the applications. The exception is the trigger source selection command which will have unique syntax for each measurement (for example, :TRIGger:<measurement name>:SOURce).

Remote Command	`:TRIGger[:SEQuence]:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|TV` `:TRIGger[:SEQuence]:SOURce?`
Example	TRIG:SOUR VID
Dependencies/Couplings	Cancel the active function whenever the trigger source is changed, because it could be a trigger level from one of the other trigger sources.

Remote Command Notes	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 TV (television) - triggers on the selected line of a TV frame Other trigger-related commands are found in the INITiate and ABORt 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.
Preset	IMMediate
State Saved	Saved in instrument state.

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:SOUR IMM
State Saved	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

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.

Dependencies/Couplings	Video trigger is allowed in average detector mode.
Example:	TRIG:SOUR VID selects video triggering.
State Saved:	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

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.

Remote Command	`:TRIGger[:SEQuence]:VIDeo:LEVel <ampl>` `:TRIGger[:SEQuence]:VIDeo:LEVel?`
Example	TRIG:VID:LEV –40 dBm
Dependencies/Couplings	This same level is used for the Video trigger source in the Trigger menu. 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	Saved in instrument state.
Min	Same as the reference level.
Max	Same as the reference level.
Key Path	**Trig, Video**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:VIDeo:SLOPe POSitive|NEGative`
	`:TRIGger[:SEQuence]:VIDeo:SLOPe?`
Example	TRIG:VID:SLOP NEG
Preset	POSitive
State Saved	Saved in instrument state.
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.

Remote Command	`:TRIGger[:SEQuence]:VIDeo:DELay <time>`
	`:TRIGger[:SEQuence]:VIDeo:DELay?`
	`:TRIGger[:SEQuence]:VIDeo:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:VIDeo:DELay:STATe?`
Example	TRIG:VID:DEL:STAT ON
	TRIG:VID:DEL 100 ms
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Min	–150 ms
Max	+500 ms
Key Path	**Trig, Video**
Default Unit	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:SOUR LINE selects line triggering.
Dependencies/Couplings	Line trigger is not available when operating from a “dc power source”, for example, when the instrument is powered from batteries.

State Saved	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:LINE:SLOPe POSitive|NEGative`
	`:TRIGger[:SEQuence]:LINE:SLOPe?`
Example	TRIG:LINE:SLOP NEG
Preset	POSitive
State Saved	Saved in instrument state.
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.

Remote Command	`:TRIGger[:SEQuence]:LINE:DELay <time>`
	`:TRIGger[:SEQuence]:LINE:DELay?`
	`: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	1.000 us
	OFF
State Saved	Saved in instrument state.
Min	–150 ms
Max	500 ms
Key Path	**Trig, Line**
Default Unit	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:SOUR EXT1 this selects the external 1 trigger input on the rear panel.
State Saved	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

Remote Command	`:TRIGger[:SEQuence]:EXTernal1:LEVel <level>` `:TRIGger[:SEQuence]:EXTernal1:LEVel?`
Example	TRIG:EXT1:LEV 0.4 V
Dependencies/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.
Preset	1.2 V
State Saved	Saved in instrument state.
Min	–5 V
Max	5 V
Key Path	**Trig, External 1**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:EXTernal1:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:EXTernal1:SLOPe?`
Example	TRIG:EXT1:SLOP NEG

Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
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.

Remote Command	`:TRIGger[:SEQuence]:EXTernal1:DELay <time>`
	`:TRIGger[:SEQuence]:EXTernal1:DELay?`
	`:TRIGger[:SEQuence]:EXTernal1:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:EXTernal1:DELay:STATe?`

Example	TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms
Preset	1 us OFF
State Saved	Saved in instrument state.
Min	–150 ms
Max	+500 ms
Key Path	**Trig, External 1**
Default Unit	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:SOUR EXT2 this selects the rear panel external 2 trigger input.
State Saved	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

Remote Command	`:TRIGger[:SEQuence]:EXTernal2:LEVel` `:TRIGger[:SEQuence]:EXTernal2:LEVel?`
Example	TRIG:EXT2:LEV 1.1 V
Dependencies/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).
Preset	1.2 V
State Saved	Saved in instrument state.
Min	–5 V
Max	5 V
Key Path	**Trig, External 2**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:EXTernal2:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:EXTernal2:SLOPe?`
Example	TRIG:EXT2:SLOP NEG
Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
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.

Remote Command	`:TRIGger[:SEQuence]:EXTernal2:DELay <time>`
	`:TRIGger[:SEQuence]:EXTernal2:DELay?`
	`:TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:EXTernal2:DELay:STATe?`
Example	TRIG:EXT2:DEL:STAT ON
	TRIG:EXT2:DEL 100 ms
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Min	–150 ms
Max	500 ms
Key Path	**Trig, External 2**
Default Unit	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:SOUR RFB
Remote Command Notes	
State Saved	Saved in instrument state.
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 (for example, after the trigger event occurs and all the applicable trigger criteria have been met).

Trigger Level

Sets the absolute trigger level for the RF burst envelope. See key notes regarding the relative trigger level.

Remote Command	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl>`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?`

Dependencies/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).
Preset	–20 dBm
State Saved	Saved in instrument state.
Min	–200 dBm
Max	100 dBm
Key Path	**Trig, RF Burst**
Default Unit	Absolute trig level: depends on the current selected amplitude units.

Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:RFBurst:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:RFBurst:SLOPe?`
Example	TRIG:RFB:SLOP NEG
Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
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 the time domain or FFT, but not in swept spans.

Remote Command	`:TRIGger[:SEQuence]:RFBurst:DELay <time>`
	`:TRIGger[:SEQuence]:RFBurst:DELay?`
	`:TRIGger[:SEQuence]:RFBurst:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:RFBurst:DELay:STATe?`

Example	TRIG:RFB:DEL:STAT ON TRIG:RFB:DEL 100 ms
Preset	1 us OFF

State Saved	Saved in instrument state.
Min	–150 ms
Max	500 ms
Key Path	**Trig, RF Burst**
Default Unit	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:SOUR FRAM
Remote Command Notes	
State Saved	Saved in instrument state.
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 (i.e. after the trigger event occurs and all the applicable trigger criteria have been met).

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 every external synchronization pulse by resetting the internal state of the timer circuit.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:PERiod <time>` `:TRIGger[:SEQuence]:FRAMe:PERiod?`
Example	TRIG:FRAM:PER 100 ms
Dependencies/Couplings	The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes.
Preset	20 ms
State Saved	Saved in instrument state.

Min	100.000 ns
Max	559.0000 ms
Key Path	**Trig, Periodic Timer**
Default Unit	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 unsynchronized 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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:OFFSet <time>` `:TRIGger[:SEQuence]:FRAMe:OFFSet?`
Example	TRIG:FRAM:OFFS 1.2 ms
Dependencies/Couplings	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
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	Saved in instrument state.
Min	–10.000 s
Max	10.000 s
Key Path	**Trig, Periodic Timer**

Default Unit	s

Offset Adjust (remote command only)

Remote Command	:TRIGger[:SEQuence]:FRAMe:ADJust <time>
Example	TRIG:FRAM:ADJ 1.2 ms
Dependencies/Couplings	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
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. This remote command does not work at all like the 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. 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	Saved in instrument state.
Min	–10.000 s
Max	10.000 s
Default Unit	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 0.0s offset.The Offset key can then be used to add offset relative to this new timing.

Remote 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.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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:SYNC EXTernal1|EXTernal2|RFBurst|OFF` `:TRIGger[:SEQuence]:FRAMe:SYNC?`
Example	TRIG:FRAM:SYNC EXT2
Preset	OFF
State Saved	Saved in instrument state.
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
Remote Command Notes	See the "Sync Source" section.
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
Dependencies/Couplings	Same as External 1 trigger source.
Remote Command Notes	See the "Sync Source" section.
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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel <voltage>` `:TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel?`
Example	TRIG:FRAM:EXT1:LEV 0.5 V
Dependencies/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).
Preset	1.2 V
State Saved	Yes
Min	–5 V
Max	5 V
Key Path	**Trig, Periodic Timer, Sync Source, External 1**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe?`
Example	TRIG:FRAM:EXT1:SLOP NEG
Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
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
Dependencies/Couplings	Same as External 2 trigger source.
Remote Command Notes	See the "Sync Source" section.

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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal2:LEVel` `:TRIGger[:SEQuence]:FRAMe:EXTernal2:LEVel?`
Example	TRIG:FRAM:EXT2:LEV 0.5 V
Dependencies/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).
Preset	1.2 V
State Saved	Saved in instrument state.
Min	–5 V
Max	5 V
Key Path	**Trig, Periodic Timer, Sync Source, External 2**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe?`
Example	TRIG:FRAM:EXT2:SLOP NEG
Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
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

Dependencies/Couplings	Same as RF Burst trigger source.
Remote Command Notes	See the "Sync Source" section.
Key Path	**Trig, Periodic Timer, Sync Source**

Trigger Level

Sets the absolute trigger level for the RF burst envelope. See key notes regarding the relative trigger level..

Remote Command	`:TRIGger[:SEQuence]:FRAMe:RFBurst:LEVel:ABSolute <ampl>` `:TRIGger[:SEQuence]:FRAMe:RFBurst:LEVel:ABSolute?`
Dependencies/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).
Preset	–20 dBm
State Saved	Saved in instrument state.
Min	–100 dBm
Max	100 dBm
Key Path	**Trig, Periodic Timer, Sync Source, RF Burst**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe POSitive|NEGative` `:TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe?`
Example	TRIG:FRAM:RFB:SLOP NEG
Dependencies/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).
Preset	POSitive
State Saved	Saved in instrument state.
Key Path	**Trig, Periodic Timer, Sync Source, RF Burst**

Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

Remote Command	`:TRIGger[:SEQuence]:FRAMe:DELay <time>`
	`:TRIGger[:SEQuence]:FRAMe:DELay?`
	`:TRIGger[:SEQuence]:FRAMe:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:FRAMe:DELay:STATe?`
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Min	–150 ms
Max	+500 ms
Key Path	**Trig, Periodic Timer**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:ATRigger <time>`
	`:TRIGger[:SEQuence]:ATRigger?`
	`:TRIGger[:SEQuence]:ATRigger:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:ATRigger:STATe?`
Example	TRIG:ATR:STAT ON
	TRIG:ATR 100 ms
Preset	100 ms
	OFF
State Saved	Saved in instrument state.
Min	0 s
Max	100 s
Key Path	**Trig**
Default Unit	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.

Remote Command	`:TRIGger[:SEQuence]:HOLDoff <time>`
	`:TRIGger[:SEQuence]:HOLDoff?`
	`:TRIGger[:SEQuence]:HOLDoff:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:HOLDoff:STATe?`
Example	TRIG:HOLD:STAT ON
	TRIG:HOLD 100 ms
Preset	100 ms
	OFF
State Saved	Saved in instrument state.
Min	0 s
Max	.5 s
Key Path	**Trig**
Default Unit	s

6 Channel Power

The Channel Power is the total power measured in the specified integration bandwidth.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Key Path	**Meas**

Power Spectral Density

The power spectral density is the measured power in the signal normalized to 1 Hz.

Remote Command Results

These command are used to measure the total rms power in a specified integration bandwidth. You must be in the Spectrum Analysis, cdma2000, or W-CDMA mode to use these commands.

Use :INSTrument:SELect to set the mode.

Command	Return Value
`:CONFigure:CHPower` `:INITiate:CHPower`	N/A

`:FETCh:CHPower[n]?`
`:MEASure:CHPower[n]?`
`:READ:CHPower[n]?`
	Refer to the table below.

`:FETCh:CHPower:CHPower?`
`:MEASure:CHPower:CHPower?`
`:READ:CHPower:CHPower?`
	Returns the Channel Power (dBm)
	(BW compatibility functionality)

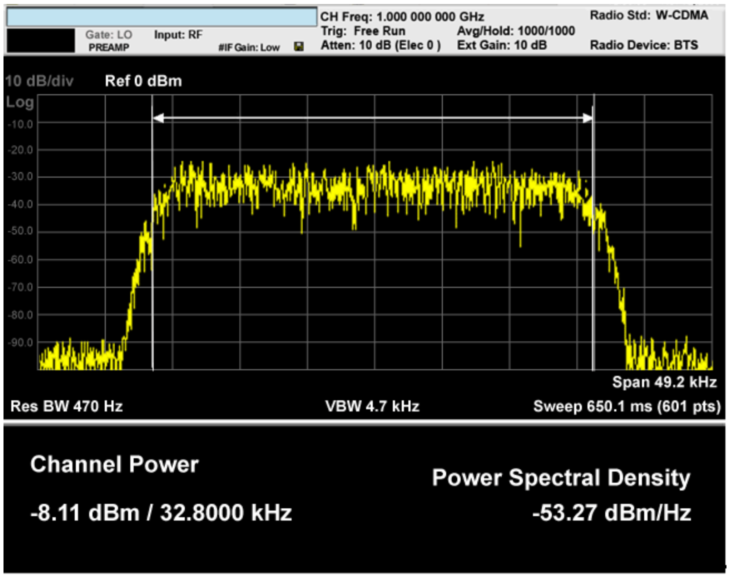
`:FETCh:CHPower:DENSity?`
`:MEASure:CHPower:DENSity?`
`:READ:CHPower:DENSity?`
	Returns the Power Spectral Density (dBm/Hz)
	(BW compatibility functionality)

n	**Results Returned**
n=1 (or not specified)	Returns scalar results: 1. Channel Power is a floating point number representing the total channel power in the specified integration bandwidth. 2. PSD (Power Spectral Density) is the power (in dBm/Hz) in the specified integration bandwidth.
2	Returns floating point numbers that are the captured trace data of the power (in dBm/resolution BW) of the signal. The frequency span of the captured trace data is specified by the Span key.

Measurement Results and Views

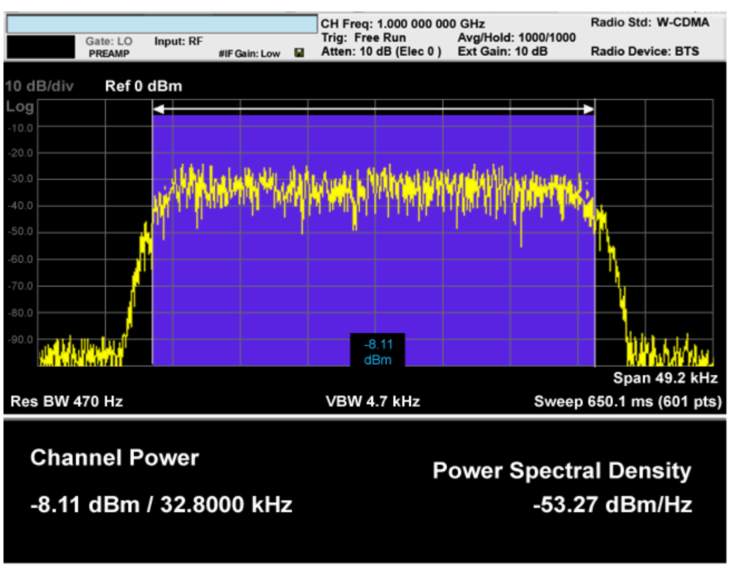
The results of the measurement can be displayed as a single spectrum trace view or displayed with a Bar Graph trace on the spectrum trace.

Spectrum View



Spectrum View with Bar Graph on

This View is the same as the 'Spectrum' view, but has a blue bar between the markers that indicates the measured output power level. The bar graph is activated when the "Bar Graph" Soft Key is set to ON under the View/Display menu. The actual measured output power level is displayed on the display at the bottom of the bar.



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.

The default (and minimum) Span is calculated using the number of carriers and the carrier width where;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)

The span is increased by a factor of 1 + Filter Alpha if the RRC Filter in on.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN <freq>` `[:SENSe]:CHPower:FREQuency:SPAN?`
Example	:CHP:FREQ:SPAN 10 MHz :CHP:FREQ:SPAN?
Dependencies/Couplings	When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of span /RBW is approximately 106:1. When the Res BW is set to Man, bandwidths are entered by the user, and these bandwidths are used regardless of other analyzer settings. Since Span is coupled to Integ BW in the factory default condition, if you change the integration bandwidth setting, the span setting changes by a proportional amount until a limit value is reached. However, the span can be individually set. The minimum value of the span is coupled with the integration bandwidth.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 3 MHz WCDMA: 7.5 MHz C2K: 1.845 MHz WIMAXOFDMA: 20 MHz
State Saved	Saved in instrument state.
Min	100 Hz

Max	100 MHz
Key Path	**Span**

Full Span

Changes the span to show the full frequency range of the spectrum analyzer.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN:FULL`
Example	:CHP:FREQ:SPAN:FULL
Dependencies/Couplings	Selecting full span will change the measurement span value.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Span**

Last Span

Changes the span to the previous span setting. If no previous span value exists, then the span will remain unchanged.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:FREQuency:SPAN:PREVious`
Example	:CHP:FREQ:SPAN:PREV
Dependencies/Couplings	Selecting last span will change the measurement span value.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Span**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values, and the Internal Preamp selection are the same across all measurements.

Key Path	**Front-panel key**

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:CHP:VIEW:WINDow:TRAC:Y:RLEV 10 dBm :DISP:CHP: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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Min	ñ250.00 dBm
Max	250.00 dBm
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the 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 the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:CHP:VIEW:WIND:TRAC:Y:PDIV 2 dB :DISP:CHP: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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	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	SA, WCDMA, C2K, WIMAXOFDMA

Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:CHP:VIEW:WIND:TRAC:Y:RPOS CENT :DISP:CHP:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA 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**

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:CHP:VIEW:WIND:TRAC:Y:COUP OFF :DISP:CHP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, and the Restart front-panel key is pressed, this function automatically sets the scale per division to 10 dB and determines the reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

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**

Bar Graph

Turns the Bar Graph On and Off.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph ON|OFF|1|0` `:DISPlay:CHPower:VIEW[1]:WINDow[1]:BGRaph?`
Example	:DISP:CHP:VIEW:WIND:BGR ON :DISP:CHP:VIEW:WIND:BGR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA 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	**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 will remain 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.

Mode	SA, WCDMA, C2K, WIMAXOFDMA

Remote Command	:DISPlay:CHPower:ANNotation:TITLe:DATA <string> :DISPlay:CHPower:ANNotation:TITLe:DATA?
Example	DISP:CHP:ANN:TITL:DATA “Channel Power” DISP:CHP:ANN:TITL:DATA?
Preset	Channel Power
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/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.

- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- 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 Rose-n-fell 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.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:DETector[:FUNCtion] NORMal|AVERage|POSitive|SAMPle|NEGative` `[:SENSe]:CHPower:DETector[:FUNCtion]?`
Example	:CHP:DET NORM :CHP:DET:FUNC?
Restriction and Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This method of detection is also referred to as Rose-n-fell detection. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Negative Peak detector determines the minimum of the signal within the sweep points.
Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	AVERage
State Saved	Saved in instrument state.

Range	Normal | Average | Peak | Sample | Negative Peak
Key Path	**Front-panel key**

Auto

Sets the detector for the currently selected trace to Auto.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:DETector:AUTO ON|OFF|1|0` `[:SENSe]:CHPower:DETector:AUTO?`
Example	:CHP:DET:AUTO ON :CHP:DET:AUTO?
Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	OFF
State Saved	Saved in instrument state.
Key Path	**Trace/Detector**

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

Key Path	**Front-panel key**

Res BW

Sets the value of the resolution bandwidth (RBW). If an unavailable bandwidth is entered with the numeric keypad, the closest available bandwidth is selected.

Mode	SA, WCDMA, C2K, WIMAXOFDMA

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

Example	:CHP:BAND 5 MHz :CHP:BAND? :CHP:BAND:AUTO ON :CHP:BAND:AUTO?
Dependencies/Couplings	Sweep time is coupled to the RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1). When the Res BW is set to Auto, the resolution bandwidth is auto-coupled to the span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, and the bandwidths are entered manually, these bandwidths are used regardless of other analyzer settings.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: Auto WCDMA: 240 kHz C2K: 24 kHz WIMAXOFDMA: 180kHz WCDMA, C2K: OFF SA, WIMAXOFDMA: ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**BW**

Video BW

Changes the analyzer post-detection filter (VBW).

Mode	SA, WCDMA, C2K, WIMAXOFDMA

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

Example	:CHP:BAND:VID 2.4 MHz :CHP:BAND:VID? :CHP:BAND:VID:AUTO OFF :CHP:BAND:VID:AUTO?

Dependencies/Couplings	Video bandwidth (VBW) is coupled to the RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW. Sweep Time is coupled to the Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually "in-circuit" when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result. Although the VBW filter is not "in-circuit" when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace. When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out). When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: Auto WCDMA: 2.4MHz C2K: 240 kHz WIMAXOFDMA: Auto, ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Key Path	**BW**

Filter Type

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

Mode	SA, WCDMA, C2K, WIMAXOFDMA

Remote Command	`[:SENSe]:CHPower:BANDwidth:SHAPe GAUSsian|FLATtop`
	
	`[:SENSe]:CHPower:BANDwidth:SHAPe?`

Example	:CHP:BAND:SHAP GAUS
	:CHP:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian | Flattop
Key Path	**BW**

Meas Setup

Displays the setup menu for the currently selected measurement. The parameters included in the measurement setup include the following:

Averaging

IF Gain

Channel Power Span

Integrated Bandwidth

Filter Bandwidth

Root Raised Cosine (RRC) Filter

Key Path	**Front-panel key**

Avg/Hold Num

Specifies the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep.

Mode	SA, WCDMA, C2K, WIMAXOFDMA

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

Example	:CHP:AVER:COUN 15 :CHP:AVER:COUN? :CHP:AVER ON :CHP:AVER?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 10 WCDMA: 200, ON WIMAXOFDMA: 200
State Saved	Saved in instrument state.
Min	1
Max	10000

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 will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:CHPower:AVERage:TCONtrol?`
Example	:CHP:AVER:TCON EXP :CHP:AVER:TCON?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	EXP
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Integ BW

Specifies the range of integration used in calculating the power in the channel. The integration bandwidth is displayed on the trace as two markers connected by an arrow.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:BANDwidth:INTegration <bandwidth>` `[:SENSe]:CHPower:BANDwidth:INTegration?`
Example	:CHP:BAND:INT 10 MHz :CHP:BAND:INT?
Dependencies/Couplings	The minimum value of the span is coupled with the integration bandwidth.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 2 MHz WCDMA: 5 MHz C2K: 1.23 MHz WIMAXOFDMA: 10 MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	100 MHz
Key Path	**Meas Setup**

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**

IF Gain Auto

Activates the auto rules for IF Gain. When Auto is active, the IF Gain is set to High Gain under any 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.

Remote Command	`[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:CHPower:IF:GAIN:AUTO[:STATe]?`
Example	:CHP:IF:GAIN:AUTO ON :CHP:IF:GAIN:AUTO?
Dependencies/Couplings	When the auto attenuation exists (for example, with an electrical attenuator), the IF Gain setting is changed using the following rule. Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other settings, auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Off | On
Key Path	**Meas Setup, IF Gain**

IF Gain State

Selects the range of the IF Gain.

Remote Command	`[:SENSe]:CHPower:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:CHPower:IF:GAIN[:STATe]?`
Example	:CHP:IF:GAIN ON :CHP:IF:GAIN?
Dependencies/Couplings	When the auto attenuation exists (for example, with an electrical attenuator), the IF Gain setting is changed as following rule. Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other settings, auto sets IF Gain to Low Gain.
Remote Command Notes	ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain | High Gain
Key Path	**Meas Setup, IF Gain**

RRC Filter

Turns the Root Raised Cosine (RRC) filter On or Off. The α value (roll off) for the filter is set to the value of the Filter Alpha parameter, and the RRC filter bandwidth is set to the Filter BW parameter.

Mode	SA, WCDMA
Remote Command	`[:SENSe]:CHPower:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:CHPower:FILTer[:RRC][:STATe]?`
Example	:CHP:FILT OFF :CHP:FILT?
Restriction and Notes	This parameter is normally used when TETRA is selected as the Radio Std.
Remote Command Notes	You must be in the Spectrum Analysis mode or W-CDMA 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**

Filter BW

Inputs the Root Raised Cosine (RRC) filter bandwidth. Normally, the filter bandwidth is the same as the symbol rate of the signal.

Mode	SA, WCDMA, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:FILTer[:RRC]:BANDwidth <real>` `[:SENSe]:CHPower:FILTer[:RRC]:BANDwidth?`
Example	:CHP:FILT:BAND 10 MHz :CHP:FILT:BAND?
Restriction and Notes	This parameter is normally used when TETRA is selected as the Radio Std.
Remote Command Notes	You must be in the Spectrum Analysis mode or W-CDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 3.84MHz WCDMA: 3.84MHz WIMAXOFDMA: 10 MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	100 MHz
Key Path	**Meas Setup**

Filter Alpha

Inputs the alpha value for the Root Raised Cosine (RRC) filter.

Mode	SA, WCDMA
Remote Command	`[:SENSe]:CHPower:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:CHPower:FILTer[:RRC]:ALPHa?`
Example	:CHP:FILT:ALPH 0.5 :CHP:FILT:ALPH?
Restriction and Notes	This parameter is normally used when TETRA is selected as the Radio Std.
Remote Command Notes	You must be in the Spectrum Analysis mode or W-CDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.22

State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CONFigure:CHPower`
Example	:CONF:CHP
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	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:TRIGger:CHPower[:SEQuence]:SOURce IMMediate|VIDeo|LINE|EXTernal[1]|EXTernal2|RFBurst|FRAMe|IF` `:TRIGger:CHPower[:SEQuence]:SOURce?`
Example	:TRIG:CHP:SOUR VID :TRIG:CHP:SOUR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WIMAXOFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run I Video I Line I External1 I External2 I RF Burst I Periodic Timer
Key Path	**Front-panel key**

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

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

Key Path	**Front-panel key**

Sweep Time

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

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

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

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:SWEep:TIME <time>`
	`[:SENSe]:CHPower:SWEep:TIME?`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:CHPower:SWEep:TIME:AUTO?`
Example	:CHP:SWE:TIME 25 ms
	:CHP:SWE:TIME?
	:CHP:SWE:TIME:AUTO OFF
	:CHP:SWE:TIME:AUTO?
Preset	SA, WIMAXOFDMA: Automatically Calculated
	WCDMA: 1.0 ms
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Key Path	**Sweep/Control**

Sweep Setup

Accesses a menu that enables you to set the sweep state for the current measurement.

Key Path	**Sweep/Control**

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting **Auto Sweep Time** to **Accy** will result in slower sweep times, usually about three times as long, but yields better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when **Auto Sweep Time** is set to **Accy**.

Additional amplitude errors which occur when **Auto Sweep Time** is set to **Norm** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **Norm** is the preferred setting of **Auto Sweep Time**. **Auto Sweep Time** is set to **Norm** on a **Preset** or **Auto Couple**. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:CHPower:SWEep:TIME:AUTO:RULes?`
Example	:CHP:SWE:TIME:AUTO:RUL NORM :CHP:SWE:TIME:AUTO:RUL?
Restriction and Notes	In Zero Span, this key is irrelevant and inaccessible (because the whole Sweep Setup menu is grayed out in Zero Span), however its settings can be changed remotely with no error indication. Set to Norm when Auto Couple is pressed or sent remotely
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm | Accy
Key Path	**Sweep/Control, Sweep Setup**

Pause/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 when it was paused.

See Sweep/Control in the "Measurement Functions" section for more information.

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 will default to 1001. The current value of points is displayed parenthetically, next to the sweep time in the lower-right corner of the display.

Changing the number of points has several effects on the analyzer. Since markers are read at the point location, the marker reading may change. All trace data is cleared.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`[:SENSe]:CHPower:SWEep:POINts <integer>` `[:SENSe]:CHPower:SWEep:POINts?`
Example	:CHP:SWE:POIN 501 :CHP:SWE:POINt?
Restriction and Notes	Whenever the number of sweep points change: All trace data is erased Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) Sweep time is re-quantized Any limit lines that are on are updated If averaging/hold is on, averaging/hold starts over
Dependencies/Couplings	Whenever the number of sweep points change, the sweep time is re-quantized.
Preset	1001
State Saved	Saved in instrument state.
Min	101
Max	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

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	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF :CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?
Example	:CALC:CHP:MARK3:MODE POS :CALC:CHP:MARK3: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	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

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal**, **Delta,** or **Fixed**.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	:CALC:CHP:MARK3:X :CALC:CHP:MARK3:X?
Restriction and Notes	The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker X Axis Position

Sets the marker X Axis Scale position in trace points. This setting has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	:CALC:CHP:MARK10:X:POS :CALC:CHP: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**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker Y Axis Value

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

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:CHP:MARK11:Y?
Preset	Result dependent on Markers setup and signal source.
State Saved	No

Properties

Accesses the marker properties menu.

Key Path	**Marker**

Relative To

Selects the desired marker. The selected marker is relative to its reference marker.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:CHP:MARK:REF 5 :CALC:CHP: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 Spectrum Analysis or WCDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1
State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Marker, Properties**

All Markers Off

Turns off all markers.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer:AOFF`
Example	:CALC:CHP:MARK:AOFF
Key Path	**Marker**

Marker To

There is no ‘Marker To’ functionality supported in Channel Power, so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

There are no ‘Marker Functions’ supported in Channel Power, so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value. Pressing Peak Search with the selected marker Off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Mode	SA, WCDMA, C2K, WIMAXOFDMA
Remote Command	`:CALCulate:CHPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:CHP:MARK2:MAX
Key Path	**Front-panel key**

7 ACP

ACP is a measurement of the amount of interference, or power, in an adjacent frequency channel. The results are displayed as a bar graph or as spectrum data, with measurement data at specified offsets.

Key Path	**Meas**

Remote Command Results

The following commands are used to retrieve the measurement results:

`:CONFigure:ACP`

`:INITiate:ACP`

`:FETCh:ACP[n]?`

`:READ:ACP[n]?`

`:MEASure:ACP[n]?`

Condition	N	Results Returned
Mode = SA mode, Radio Std = None, Number of carriers = 1 and only offset A is on	Not specified or n=1	Returns 3 comma-separated values that correspond to: Reference carrier power, lower-adjacent channel power (dBc), and upper-adjacent channel power (dBc).

Meas Type = Total power reference	Not specified or n=1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm) 3. 0.0 4. Reference carrier power (dBm) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm) ..... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm) If the results are not available,–999.0 is returned.

Meas Type = Power spectral density reference	not specified or n=1	Returns 28 comma-separated scalar results, in the following order. 1. 0.0 2. Total carrier power (dBm/Hz) 3. 0.0 4. Reference carrier power (dBm/Hz) 5. Lower offset A - relative power (dB) 6. Lower offset A - absolute power (dBm/Hz) 7. Upper offset A - relative power (dB) 8. Upper offset A - absolute power (dBm/Hz) 9. Lower offset B - relative power (dB) 10. Lower offset B - absolute power (dBm/Hz) 11. Upper offset B - relative power (dB) 12. Upper offset B - absolute power (dBm/Hz) ..... 25. Lower offset F - relative power (dB) 26. Lower offset F - absolute power (dBm/Hz) 27. Upper offset F - relative power (dB) 28. Upper offset F - absolute power (dBm/Hz) If the results are not available,–999.0 is returned.
Meas Method = FAST	not specified or n=1	Returns 5 comma-separated results, in the following order: 1. Reference carrier - absolute power (dBm) 2. Lower offset A - absolute power (dBm) 3. Upper offset A - absolute power (dBm) 4. Lower offset B - absolute power (dBm) 5. Upper offset B - absolute power (dBm)

Meas Type = Total power reference	2	Returns 48 scalar results, in the following order: 1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm) ..... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm) ..... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm) If the results are not available, –999.0 is returned.

Meas Type = Power spectral density reference	2	Returns 48 scalar results, in the following order: 1. Channel (1) - relative power (dB) 2. Channel (1) - absolute power (dBm/Hz) 3. Channel (2) - relative power (dB) 4. Channel (2) - absolute power (dBm/Hz) ..... 23. Channel (12) - relative power (dB) 24. Channel (12) - absolute power (dBm/Hz) 25. Lower offset A - relative power (dB) 26. Lower offset A - absolute power (dBm/Hz) 27. Upper offset A - relative power (dB) 28. Upper offset A - absolute power (dBm/Hz) 29. Lower offset B - relative power (dB) 30. Lower offset B - absolute power (dBm/Hz) 31. Upper offset B - relative power (dB) 32. Upper offset B - absolute power (dBm/Hz) ..... 45. Lower offset F - relative power (dB) 46. Lower offset F - absolute power (dBm/Hz) 47. Upper offset F - relative power (dB) 48. Upper offset F - absolute power (dBm/Hz) If the results are not available, –999.0 is returned.

Meas Type = Total power reference	3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as total power in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ..... 21 Lower offset F - relative limit result 22 Lower offset F - absolute limit result 23 Upper offset F - relative limit result 24 Upper offset F - absolute limit result
Meas Type = Power spectral density reference	3	Returns 24 scalar values of the pass/fail (0 = passed, or 1 = failed) determined by testing the relative to the reference carrier and by testing the absolute power limit of the offset frequencies (measured as power spectral density in dB): 1. Lower offset A - relative limit result 2. Lower offset A - absolute limit result 3. Upper offset A - relative limit result 4. Upper offset A - absolute limit result 5. Lower offset B - relative limit result 6. Lower offset B - absolute limit result 7. Upper offset B - relative limit result 8. Upper offset B - absolute limit result ..... 21 Lower offset F - relative limit result 22 Lower offset F - absolute limit result 23 Upper offset F - relative limit result 24 Upper offset F - absolute limit result

Measurement Results and Views

On the graph display, the carriers and offsets are identified using a color scheme. The appropriate color is applied to the vertical lines to identify the offset, and when the Bar graph is on, the appropriate color is applied to the width arrow to identify the offset.

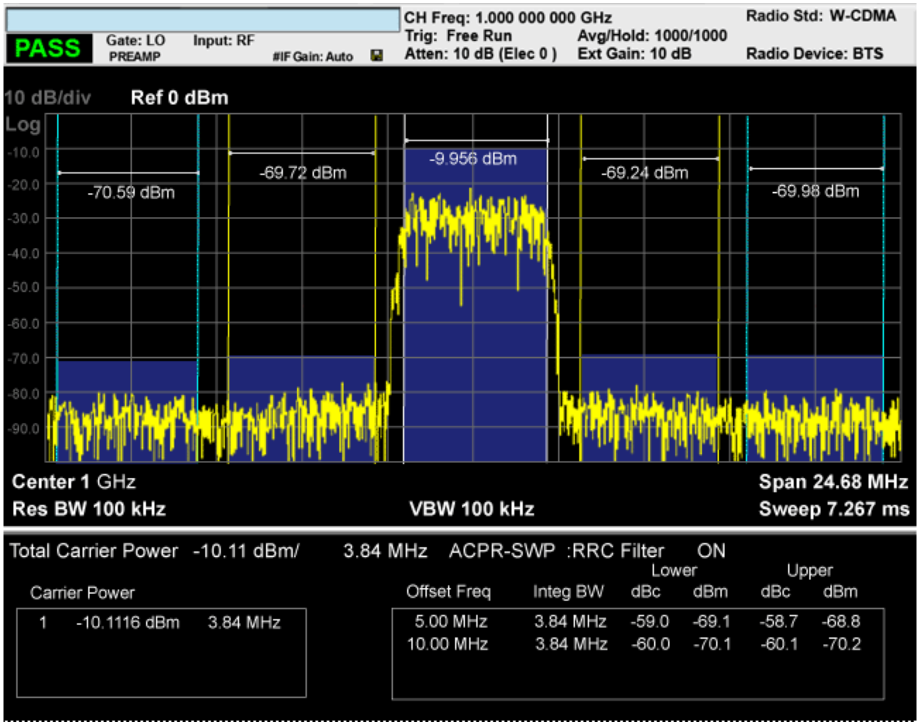
Carrier/Offset	Color
Reference Carrier	White
Carrier with Power Present	Red
Carrier with No Power Present	Blue
Offset A	Yellow
Offset B	Cyan
Offset C	Magenta
Offset D	Green
Offset E	Dark Blue
Offset F	Grey

When the Bar Graph is On and Limit Test is On, the color of each bar graph reflects the limit test result. When the limit test fails, the bar color is red, and when limit test passes, the bar color is blue.

When RBW is selected as the measurement method, the spectrum trace is not displayed, only the bar graph is displayed. In addition, the Bar Graph key (under the View/Display front panel key) is set to ON and is grayed out.

The RRC Filter display item is only displayed when RRC filter is on.

Spectrum View



Measurement Results

The text window displays the following results:

Total Carrier Power

This is the total power of all the carriers with carrier power present set to yes. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for each carrier and then totaling the sums. The total integration bandwidth is shown as part of the result. This will be the total of the Carrier Integ Bw of the carriers used in calculating the total carrier power. If the RRC Filter is on, then the integration bandwidth used is (1 + alpha)/T where T = 1/(Carrier Integ Bw) multiplied by the number of carriers with carrier power present set to yes.

Ref Carrier Power

This is the power in the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter for that carrier. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for that carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

Carrier Power

This is the power in all the currently defined carriers. If the carrier has carrier power present, the power will be absolute. If the carrier is defined as not having power present, the power will be relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Carrier Integ Bw parameter. The integration bandwidth is shown as part of the result. This is the value of the Carrier Integ Bw for the carrier unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Carrier Integ Bw).

As there are potentially more results than can be easily viewed on the display, a scrollable list is used to display all results. The Carrier Results menu key is used to index the carrier amplitude results. This key is grayed out unless the measurement is in single mode (as in continual measurement mode). The display is continuously updating and will not need to be accessed. The currently selected Carrier Result is displayed on the last line of the carrier power result list unless:

The selected Carrier Result is 4 or less in normal multi carrier power results view. In this case the first 4 carrier power results will be displayed.

The selected Carrier Result is 9 or greater in normal multi carrier power results view. In this case the last 4 carrier power results will be displayed.

The zoom mode is selected. In this case all carrier power ranges can be displayed.

Offset Relative Power

This is the power in the offsets relative to the reference carrier. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

Offset Absolute Power

This is the absolute power in the offsets. The power is calculated by integrating across the bandwidth declared by the Offset Integ Bw parameter. The offset integration bandwidth is shown as part of the result. This is the value on the Offset Integ Bw menu key unless the RRC Filter is on, then the integration bandwidth used is the displayed value, which is (1 + alpha)/T where T = 1/(Offset Integ Bw).

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.

The default (and minimum) span is calculated using the number of carriers and the carrier width where;

Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)

The span is increased by a factor of 1 + Filter Alpha if the RRC Filter in on.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN <freq>` `[:SENSe]:ACPower:FREQuency:SPAN?`
Example	ACP:FREQ:SPAN 25 MHz ACP:FREQ:SPAN?
Dependencies/Couplings	The span value is clipped when the carrier settings and/or the offset settings are changed. The value is changed to satisfy following formula: Span = (Upper Carrier Freq + (max offset IBW * (1 + alpha)) / 2) - (Lower Carrier Freq - (max offset IBW * (1 + alpha)) / 2)
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 8 MHz WCDMA: 24.6848 MHz C2K: 0 Hz WiMAX OFDMA: 50MHz
State Saved	Saved in instrument state.
Min	10 Hz

Max	Hardware Dependent: Option 503 = 3.6 GHz Option 508 = 8.4 GHz Option 513 = 13.6 GHz Option 526 = 26.5 GHz
Key Path	**Span/X Scale**

Full Span

Changes the span to show the full frequency range of the spectrum analyzer.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:FULL`
Example	ACP:FREQ:SPAN:FULL
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Span/X Scale**

Last Span

Changes the span to the previous span setting. If no previous span value exists, then the span will remain unchanged.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:FREQuency:SPAN:PREVious`
Example	ACP:FREQ:SPAN:PREV
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Span/X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values and the Internal Preamp selections are the same across all measurements.

Key Path	**Front-panel key**

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RLEV <real> DISP:ACP: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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
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 attenuation settings. This key has read-back text that describes the 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 the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:PDIV 5 dB DISP:ACP: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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:ACP:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ACPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:ACP:VIEW:WIND:TRAC:Y:COUPl ON DISP:ACP:VIEW:WIND:TRAC:Y:COUPl?
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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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**

View/Display

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 will remain 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.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:ANNotation:TITLe:DATA <string>`
	`:DISPlay:ACPower:ANNotation:TITLe:DATA?`
Example	DISP:ACP:ANN:TITL:DATA "ACP"
	DISP:ACP:ANN:TITL:DATA?
Preset	ACP
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Bar Graph

Turns the Bar Graph On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph OFF|ON|0|1`
	`:DISPlay:ACPower:VIEW[1]:WINDow[1]:BGRaph?`
Example	DISP:ACP:VIEW:WIND:BGR OFF
	DISP:ACP:VIEW:WIND:BGR?

Dependencies/Couplings	When the method is RBW, this key is always set to On and grayed out.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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

Accesses a menu of functions that enables you to control the detectors for the current measurement. The following choices are available:

Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- 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 Rose-n-fell 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.
- 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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:DETector[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle`
	`[:SENSe]:ACPower:DETector[:FUNCtion]?`
Example	ACP:DET NORM
	ACP:DET?

Restriction and Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The detector choices are: The Sample detector indicates the instantaneous level of the signal at the center of the data represented by each display point. The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rose-n-fell detection. The Average detector determines the average of the signal within the data range. The averaging method depends upon Average Type selection (voltage, power or log scales). The Peak detector determines the maximum of the signal within the data range. The Negative Peak detector determines the minimum of the signal within the data range. Because they may not find a spectral component's true peak, neither average nor sample detectors measure amplitudes of CW signals as accurately as peak or normal, but they do measure noise without the biases of peak detection. When a detector selection is made, the menu returns to the previous menu.
Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak
Key Path	**Front-panel key**

Auto

Sets the detector for the currently selected trace to auto.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:DETector:AUTO ON|OFF|1|0` `[:SENSe]:ACPower:DETector:AUTO?`
Example	ACP:DET POS ACP:DET?

Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	ON
State Saved	Saved in instrument state.
Range	ON | OFF
Key Path	**Trace/Detector, Detector**

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

Key Path	**Front-panel key**

Res BW

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:BAND 25 kHz ACP:BAND? ACP:BAND:AUTO ON ACP:BAND:AUTO?
Restriction and Notes	This key is available only in IBW mode. This parameter is preset by the Meas Method selection. Preset values are followings: IBW: 100 kHz IBWR: 27 kHz FAST: 390 kHz
Dependencies/Couplings	The resolution bandwidth is coupled to the video bandwidth based on the video to resolution bandwidth ratio setting if AUTO is selected.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 220 kHz WCDMA: 100 kHz WiMAX OFDMA: 470KHz 0

State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**BW**

Video BW

Changes the analyzer post-detection filter (VBW).

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	BAND:VID 1 KHZ BAND:VID? ACP:BWID:VID:AUTO ON ACP:BWID:VID:AUTO?
Remote Command Notes	The values shown in this table reflect the conditions after a Mode Preset.
Preset	SA: 22 kHz WCDMA: 1MHz WiMAX OFDMA: 5 MHz SA: ON WCDMA:OFF WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Key Path	**BW**

RBW Control

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

Key Path	**BW**

Filter Type

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:BANDwidth:SHAPe GAUSsian|FLATtop`
	`[:SENSe]:ACPower:BANDwidth:SHAPe?`
Example	ACP:BAND:SHAP GAUS
	ACP:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Key Path	**BW, RBW Control**

Filter BW

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:BANDwidth:TYPE DB3|DB6`
	`[:SENSe]:ACPower:BANDwidth:TYPE?`
Example	ACP:BAND:TYPE NOIS
	ACP:BAND:TYPE?
Dependencies/Couplings	Grayed out unless the Gaussian filter type is selected
Preset	DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)|–6 dB
Key Path	**BW, RBW Control**

Meas Setup

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

Key Path	**Front-panel key**

Average/Hold Number

Specifies the number of measurement averages used to calculate the measurement result. The average will be displayed at the end of each sweep.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:AVER:COUN 250 ACP:AVER:COUN? ACP:AVER OFF ACP:AVER?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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**

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 will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:ACPower:AVERage:TCONtrol?`
Example	ACP:AVER:TCON EXP ACP:AVER:TCON?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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**

Carrier Setup

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

Key Path	**Meas Setup**

Carriers

Specifies the number of carriers to be measured.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:COUNt <integer>` `[:SENSe]:ACPower:CARRier[1]|2:COUNt?`
Example	ACP:AVER:TCON EXP ACP:AVER:TCON?
Dependencies/Couplings	When Number of Carriers is 1, Ref Carrier and Configure Carriers are grayed out. Changing this parameter might affect to the Span.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	1

State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Ref Carrier

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

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

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:CARR:RCAR 1 ACP:CARR:RCAR? ACP:CARR:RCAR:AUTO OFF ACP:CARR:RCAR:AUTO?
Dependencies/Couplings	If you enter a carrier value that is currently configured as having no power present, that carrier will be changed to having power present. If there is only one carrier, this key will be grayed out. If you enter a ref carrier this parameter will be set to manual.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	Auto determined
State Saved	Saved in instrument state.
Min	1
Max	Number of available carriers
Key Path	**Meas Setup, Carrier Setup**

Ref Car Freq

Sets the reference carrier frequency.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:CARR:RCFR 250 MHz ACP:CARR:RCFR? ACP:CARR:RCFR:AUTO OFF ACP:CARR:RCFR:AUTO?
Dependencies/Couplings	Coupled to the Center Frequency. If the center frequency changes, the Ref Carrier Frequency is calculated using the following three steps; Ref Freq1 = Ctr Freq - (Total of all Carrier Widths / 2) Ref Freq2 = Ref Freq1 + (Total of all Carrier Widths up to Ref Carrier) Ref Freq = Ref Freq2 + (0.5 * Carrier Width of Ref Carrier) If reference carrier frequency changes the Center Frequency is calculated using the following three steps; Ctr Freq1 = Ref Freq - (0.5 * Carrier Width of Ref Carrier) Ctr Freq2 = Ctr Freq1 - (Total of all Carrier Widths up to Ref Carrier) Ctr Freq = Ctr Freq2 + (Total of all Carrier Widths / 2) This ensures that the carriers are always centered on the screen. If there is only one carrier present the Reference Carrier Frequency will be the same as the Center Frequency.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	Calculated based on the current Center Frequency
State Saved	Saved in instrument state.
Min	–79.999995 MHz

Max	Hardware Dependent: Option 503 = 3.699999995 GHz Option 508 = 8.499999995 GHz Option 513 = 13.799999995 GHz Option 526 = 26.999999995 GHz
Key Path	**Meas Setup, Carrier Setup**

Power Ref

Sets the multi-carrier power reference.

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

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:CARR 10 dBm ACP:CARR? ACP:CARR:AUTO OFF ACP:CARR:AUTO?
Dependencies/Couplings	This key is available only when the Meas Type is TPRef.
Remote Command Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement. Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.0 ON
State Saved	Saved in instrument state.
Min	–200 dBm
Max	200 dBm

Key Path	**Meas Setup, Carrier Setup**

PSD Ref

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:CPSD <real>`
	`[:SENSe]:ACPower:CARRier[1]|2:CPSD?`
Example	ACP:CARR:CPSD 25 dBm
	ACP:CARR:CPSD?
Dependencies/Couplings	This key is available only when the Meas Type is PSDRef
Remote Command Notes	Although the default value is defined, the value is recalculated by the measurement result just after measurement.
	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS.
	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.0
State Saved	Saved in instrument state.
Min	–999 dBm
Max	999 dBm
Key Path	**Meas Setup, Carrier Setup**

Configure Carriers

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

Key Path	**Meas Setup, Configure Carriers**

Carrier

Selects the carrier to configure for the current measurement.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Dependencies/Couplings	Max value is the number of available carriers, so this value might change when the number of carriers is changed.

Preset	1
State Saved	No
Min	1
Max	Number of available carriers
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Carrier Coupling

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle OFF|ON|0|1, ...` `[:SENSe]:ACPower:CARRier[1]|2:LIST:COUPle?`
Example	ACP:CARR:LIST:COUP OFF, ... ACP:CARR:LIST:COUP?
Dependencies/Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are Carrier Power Preset, Carrier Spacing, Measurement Noise Bandwidth, Method and Filter Alpha. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Couple | Man
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Carrier Pwr Present

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

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

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent YES|NO, ...` `[:SENSe]:ACPower:CARRier[1]|2:LIST:PPResent?`
Example	ACP:CARR2:LIST:PPR YES, ... ACP:CARR2:LIST:PPR?
Dependencies/Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. If there are only one or two carriers, this key will be greyed out as they both need to have power present.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes | No
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Carrier Spacing

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

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh <bandwidth>, ...`
	`[:SENSe]:ACPower:CARRier[1]|2:LIST:WIDTh?`
Example	ACP:CARR2:LIST:WIDT 25 kHz, ...
	ACP:CARR2:LIST:WIDT?
Dependencies/Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
	Changing Carrier Spacing might affect the Span.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS.
	When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	5 MHz
State Saved	Saved in instrument state.
Min	0 Hz
Max	45 MHz
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Measurement Noise Bandwidth

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

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration] <freq>, ...`
	`[:SENSe]:ACPower:CARRier[1]|2:LIST:BANDwidth[:INTegration]?`
Example	ACP:CARR2:LIST:BAND 25 kHz, ...
	ACP:CARR2:LIST:BAND?

Restriction and Notes	In WCDMA mode, the preset/default value is defined as 3.84 MHz. But internally, 4.6848 MHz is used as the default value.
Dependencies/Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers is set to the number of entries in the parameter list.
Remote Command Notes	Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. When setting these values remotely, the position in the list sent corresponds to the carrier. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 2 MHz WCDMA: 3.84 MHz WiMAX OFDMA: 10MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	500 MHz
Key Path	**Meas Setup, Carrier Setup, Configure Carriers**

Method

Accesses the carrier configuration method settings.

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod IBW|RRC, ...` `[:SENSe]:ACPower:CARRier[1]|2:LIST:METHod?`
Example	ACP:CARR2:LIST:METH RRC, ... ACP:CARR2:LIST:METH?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: IBW WCDMA: RRC C2K: RRC WiMAX OFDMA: IBW

State Saved	Saved in instrument state.
Range	IntegBW|RRC Weight
Key Path	**Meas Setup, Carrier Setup, Config Carriers**

Filter Alpha

Inputs the alpha value for the filter used in the current carrier configuration.

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa <real>, ...` `[:SENSe]:ACPower:CARRier[1]|2:LIST:FILTer:ALPHa?`
Example	ACP:CARR2:LIST:FILT:ALPH 0.5, ... ACP:CARR2:LIST:FILT:ALPH?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.22
State Saved	Saved in instrument state.
Min	0.01
Max	1.0
Key Path	**Meas Setup, Carrier Setup, Config Carriers**

Offset/Limits

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

Key Path	**Meas Setup, Offset/Limits**

Offset

Selects the offset to configure.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Preset	A
State Saved	Saved in instrument state.
Range	A|B|C|D|E|F
Key Path	**Meas Setup**

Offset Freq

This parameter determines the frequency difference between the center of the main channel and the center of the carrier. Each Offset Freq state value is entered individually by selecting the desired carrier on the carrier menu key using the up down arrows, RPG or numeric keypad. Then enter the Offset Freq State using the Offset Frequency softkey.

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:OFFS1:LIST 15 MHz, … ACP:OFFS1:LIST? ACP:OFFS2:LIST:STAT ON, … ACP:OFFS2:LIST:STAT?
Restriction and Notes	The label for this menu key will change depending on the currently selected radio standard or mode. For cdma2000 the label for the menu key will be Offset to Edge. For all other supported standards the label will be Offset Freq.
Dependencies/Couplings	Changing Offset Frequency might affect the Span. See the Span key section for details.
Remote Command Notes	When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted, therefore if you want to change values 2 you must send all values up to 2. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz | 3 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WCDMA: 5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz | 5.0 MHz, 10.0 MHz, 0 Hz, 0 Hz, 0 Hz, 0 Hz WiMAX OFDMA: 10MHz, 20MHz, 0Hz, 0Hz, 0Hz, 0Hz | 10MHz, 20MHz, 0Hz, 0Hz, 0Hz, 0Hz SA: ON, OFF, OFF, OFF, OFF, OFF | ON, OFF, OFF, OFF, OFF, OFF WCDMA: ON, ON, OFF, OFF, OFF, OFF | ON, ON, OFF, OFF, OFF, OFF WiMAX OFDMA: ON, ON, OFF, OFF, OFF, OFF | ON, ON, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	0 Hz
Max	500 MHz
Key Path	**Meas Setup, Offset/Limit**

Offset Integ BW

Sets the Integration Bandwidth for the offsets.

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration] <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth[:INTegration]?`
Example	ACP:OFFS2:LIST:BAND 2.5 MHz, … ACP:OFFS2:LIST:BAND?
Dependencies/Couplings	Changing Offset Integ BW might affect to the Span. See Span section for details.

Remote Command Notes	When setting these values remotely, the position in the list sent corresponds to the offset. Missing values are not permitted i.e. if you want to change values 2 you must send all values up to 2. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored. Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz|2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz, 2 MHz WCDMA: 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz|3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz, 3.84 MHz WiMAX OFDMA: 10MHz, 10MHz, 10MHz, 10MHz, 10MHz, 10MHz|10MHz, 10MHz, 10MHz, 10MHz, 10MHz, 10MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	500 MHz
Key Path	**Meas Setup, Offset/Limits**

Offset BW

Accesses the offset bandwidth menu.

Key Path	**Meas Setup, Offset/Limits**

Res BW

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:OFFS2:LIST:BAND:RES 25 kHz, … ACP:OFFS2:LIST:BAND:RES? ACP:OFFS2:LIST:BAND:RES:AUTO ON, … ACP:OFFS2:LIST:BAND:RES:AUTO?
Restriction and Notes	This key is available only in IBW mode.
Dependencies/Couplings	When Res BW Mode is AUTO, this value is exactly same as Res BW under BW key. And when this value is changed by user, Res BW Mode is also changed to Man.
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz, 220 kHz WCDMA: 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz, 100 kHz C2K: 30 kHz WiMAX OFDMA: 470KHz, 470KHz, 470KHz, 470KHz, 470KHz, 470KHz 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**Meas Setup, Offset/Limits, Offset BW**

Video BW

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:OFFS2:LIST:BAND:VID 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz, 5 MHz ACP:OFFS2:LIST:BAND:VID? ACP:OFFS2:LIST:BAND:VID:AUTO OFF, OFF, OFF, OFF, OFF, ON ACP:OFFS2:LIST:BAND:VID:AUTO?
Remote Command Notes	The values shown in this table reflect the conditions after a Mode Preset. Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 22kHz, 22kHz, 22kHz, 22kHz, 22kHz, 22kHz WCDMA: 1MHz, 1MHz, 1MHz, 1MHz, 1MHz, 1MHz C2K: 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz, 3 MHz WiMAX OFDMA: 5MHz, 5MHz, 5MHz, 5MHz, 5MHz, 5MHz ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Key Path	**Meas Setup, Offset/Limits, Offset BW**

RBW Control

Accesses the resolution bandwidth control menu.

Key Path	**Meas Setup, Offset/Limits, Offset BW**

Filter Type

Selects the type of bandwidth filter that is used.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:SHAPe GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:SHAPe?`
Example	ACP:OFFS2:LIST:BAND:SHAP FLAT, GAUS, GAUS, GAUS, GAUS, GAUS ACP:OFFS2:LIST:BAND:SHAP?

Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian, GAUSsian
State Saved	Saved in instrument state.
Range	GAUSsian|FLATtop
Key Path	**Meas Setup, Offset/Limits, Offset BW, RBW Control**

Filter BW

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:TYPE DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6, DB3|DB6` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:BANDwidth:TYPE ?`
Example	ACP:OFFS2:LIST:BAND:TYPE DB3, DB3, DB3, DB3, DB3, DB3 ACP:OFFS2:LIST:BAND:TYPE?
Dependencies/Couplings	grayed out unless the Gaussian filter type is selected
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	DB3, DB3, DB3, DB3, DB3, DB3
State Saved	Saved in instrument state.
Range	–3 dB (Normal)| –6 dB
Key Path	**Meas Setup, Offset/Limits, Offset BW, RBW Control**

Abs Limit

Enters an absolute limit value.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:ABSolute <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:ABSolute?`

Example	ACP:OFFS2:LIST:ABS –10 dBm, –10 dBm, –10 dBm, –10 dBm, –10 dBm, –10 dBm ACP:OFFS2:LIST:ABS?
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm | 0dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm, 0 dBm WCDMA: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm | 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm C2K: 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm | 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm, 50 dBm WiMAX OFDMA: 50,50,50,50,50,50
State Saved	Saved in instrument state.
Min	–200.0 dBm
Max	50.0 dBm
Key Path	**Meas Setup, Offset/Limits**

Fail

Accesses a menu that enables you to select one of the logic keys for the fail conditions between the measurement results and the test limits.

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:TEST?`

Example	ACP:OFFS2:LIST:TEST ABS, ABS, ABS, ABS, ABS, ABS ACP:OFFS2:LIST:TEST?
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, C2K: REL, REL, REL, REL, REL, REL | REL, REL, REL, REL, REL, REL WiMAX OFDMA: REL, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	AND | OR | Absolute | Relative
Key Path	**Meas Setup, Offset/Limits**

Rel Lim (Car)

Enters a relative limit value for the carrier level.

FrontPanel Unit/Terminator Keys	dBc
Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:RCARrier <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:RCARrier?`
Example	ACP:OFFS2:LIST:RCAR 0, 0, 0, 0, 0, 0 ACP:OFFS2:LIST:RCAR?
Restriction and Notes	:CALCulate:ACPower:OFFSet[1] | 2:LIST:LIMit:POSitive[:UPPer]:DATA and :CALCulate:ACPower:OFFSet[1] | 2:LIST:LIMit:NEGative[:UPPer]:DATA are expanded to support subop code.
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: –45, –60, 0, 0, 0, 0 | –45, –60, 0, 0, 0, 0 WCDMA: –44.2, –49.2, –49.2, –49.2, –49.2, –49.2 | –32.2, –42.2, –42.2, –42.2, –42.2, –42.2 C2K: 0, 0, 0, 0, 0, 0 | 0, 0, 0, 0, 0, 0 WiMAX OFDMA: –50,–60,0,0,0,0
State Saved	Saved in instrument state.

Min	–150
Max	50.0
Key Path	**Meas Setup, Offset/Limits**

Rel Lim (PSD

Enters a relative limit value for the level of the power spectral density.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:OFFSet[1]|2:LIST:RPSDensity <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:ACPower:OFFSet[1]|2:LIST:RPSDensity?`
Example	ACP:OFFS2:LIST:RPSD 10 dB, 10 dB, 10 dB, 10 dB, 10 dB, 10 dB ACP:OFFS2:LIST:RPSD?
Remote Command Notes	Offset subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: –28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB | –28.87 dB, –43.87 dB, 0 dB, 0 dB, 0 dB, 0 dB WCDMA: –44.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB, –49.2 dB | –32.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB, –42.2 dB C2K: 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB | 0 dB, 0 dB, 0 dB, 0 dB, 0 dB, 0 dB WiMAX OFDMA: –25,–35,0,0,0,0
State Saved	Saved in instrument state.
Min	–150.0 dB
Max	50.0 dB
Key Path	**Meas Setup, Offset/Limits**

Carrier Result

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Dependencies/Couplings	This key will be grayed out if there is only one carrier.

Preset	1
State Saved	No
Min	1
Max	Number of carriers.
Key Path	**Meas Setup**

Meas Method

Sets the desired method to measure ACP.

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

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

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

Fast – this provides the same method as the Integration BW method, but with optimized for speed to measure W-CDMA signal.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:METHod IBW|IBWRange|FAST|RBW` `[:SENSe]:ACPower:METHod?`
Example	ACP:METH FAST ACP:METH?
Dependencies/Couplings	IBW (Range) restricts the Res BW available for making this measurement to 30kHz. When selected the Res Bw will be clipped to this value if required and an error # displayed.
Remote Command Notes	Since FAST mode is only for WCDMA signal, you must be in WCDMA mode or SAMS mode with W3GPP radio standard. Otherwise a setting conflict error message will be reported. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: IBW WCDMA: IBW C2K: RBW WiMAX OFDMA: IBW
State Saved	Saved in instrument state.
Range	Integration BW | Filtered IBW (max dynamic range) | RBW | Fast
Key Path	**Meas Setup**

Meas Type

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:TYPE TPRef|PSDRef` `[:SENSe]:ACPower:TYPE?`
Example	ACP:TYPE PSDR ACP:TYPE?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	TPRef
State Saved	Saved in instrument state.
Range	Total Power Ref | PSD Ref
Key Path	**Meas Setup**

Limit Test

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:LIMit:STATe OFF|ON|0|1` `:CALCulate:ACPower:LIMit:STATe?`
Example	ACP:LIM OFF ACP:LIM?

Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: OFF WCDMA: ON C2K: ON WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

Offset RRC Weighting

Allows you to turn RRC filtering of the carriers and all adjacent channels on or off. The α value (roll off) for the filter will be set to the value of the Filter Alpha parameter.

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:ACPower:FILTer[:RRC][:STATe]?`
Example	ACP:FILT:STAT OFF ACP:FILT?
Restriction and Notes	This parameter is not available for cdma2000
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: OFF WCDMA: ON C2K: N/A WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

Offset Filter Alpha

Sets the alpha value for the RRC Filter.

Key Name	Offset Filter Alpha

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:ACPower:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:ACPower:FILTer[:RRC]:ALPHa?`
Example	ACP:FILT:ALPH 0.5 ACP:FILT:ALPH?
Restriction and Notes	This parameter is not available for cdma2000
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 0.22 WCDMA: 0.22 WiMAX OFDMA: 0.22 C2K: N/A
State Saved	Saved in instrument state.
Min	0.01
Max	1.00
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CONFigure:ACPower`
Example	CONF:ACP
Dependencies/Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Meas Setup**

Noise Correction

Sets the noise floor correction function to On or Off. On enables measurement noise correction when the measured power in the reference channel or any offset is close to the noise floor of the analyzer. Off turns these corrections off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:CORRection:NOISe[:AUTO] OFF|ON|0|1` `[:SENSe]:ACPower:CORRection:NOISe[:AUTO]?`
Example	ACP:CORR:NOIS OFF ACP:CORR:NOIS?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

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.

Key Path	**Front-panel key**

Trigger Source

Enables you to choose a trigger source. Trigger settings are the same across all modes.

See Triggers in the "Measurement Functions" section for more information.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:TRIGger:ACPower[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst` `:TRIGger:ACPower[:SEQuence]:SOURce?`
Example	TRIG:ACP:SOUR FRAM TRIG:ACP:SOUR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run | Line | External 1 | External 2 | RF Burst (Wideband) | Periodic Timer
Key Path	**Trigger**

Sweep/Control

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

Key Path	**Front-panel key**

Sweep Time

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

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	ACP:SWE:TIME 50 ms ACP:SWE:TIME? ACP:SWE:TIME:AUTO OFF ACP:SWE:TIME:AUTO?
Restriction and Notes	This parameter is preset by Meas Method selection. Preset values are followings: IBW: 29 ms IBWR: 108 ms FAST: 7.5 ms

Preset	SA, WiMAX OFDMA: Automatically calculated. WCDMA: 29 ms WiMAX OFDMA: 4.73 ms SA: ON WCDMA: OFF
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Key Path	**Sweep/Control**

Sweep Setup

Accesses the sweep setup menu.

Key Path	**Sweep/Control**

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:ACPower:SWEep:TIME:AUTO:RULes?`
Example	ACP:SWE:TIME:AUTO:RUL NORM ACP:SWE:TIME:AUTO:RUL?
Restriction and Notes	Set to Norm when Auto Couple is pressed or sent remotely.
Preset	SA, WCDMA, C2K:ACCuracy WiMAX OFDMA:NORMal
State Saved	Saved in instrument state.
Range	Norm | Accy
Key Path	**Sweep/Control, Sweep Setup**

Pause/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 when it was paused.

Key Path	**Sweep/Control**

Points

Sets the number of points per sweep, from 1 to 20001. The sweep time resolution setting will depend on the number of points selected.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:ACPower:SWEep:POINts <integer>` `[:SENSe]:ACPower:SWEep:POINts?`
Example	ACP:SWE:POINt 500 ACP:SWE:POINt?
Restriction and Notes	Whenever the number of sweep points change: All trace data is erased Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) Sweep time is re-quantized Any limit lines that are on will be updated If averaging/hold is on, averaging/hold starts over
Dependencies/Couplings	Whenever the number of sweep points change the sweep time is re-quantized.
Preset	1001
State Saved	Saved in instrument state.
Min	1
Max	20001
Key Path	**Sweep/Control**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE ?`
Example	CALC:ACP:MARK2:MODE DELT CALC:ACP:MARK2: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 Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state.
Range	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. This value has no effect if the control mode is **Off**.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:ACP:MARK3:X?
Restriction and Notes	The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. If the marker is **Off** the response is not a number.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering a value if the control mode is **Normal**, **Delta** or **Fixed**. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:ACP: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**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points (see "Fractional Trace Points"). If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 500 (this value might be expected value when all offset is on).
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker Y Axis Value (Remote Command only)

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:ACP:MARK11:Y?
Restriction and Notes	Since the result value is always calculated from acquisition data, the default value is arbitrary. Although the Preset/Default values are defined.
Preset	Result dependent on markers setup and signal source.
State Saved	No

Properties

Accesses the marker properties menu.

Key Path	**Marker**

Relative To

Selects the desired marker. The selected marker will be relative to its reference marker.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:ACP:MARK2:REF 6 CALC:ACP:MARK2: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 will be returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: "Settings conflict; marker cannot be relative to itself." You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Marker, Properties**

Couple Marker

When this function is On, moving any marker causes an equal X axis movement of every other marker which is not **Off**. By "equal X axis movement" we mean that we preserve the difference between each marker's X axis value (in the fundamental x-axis units of the trace that marker is on) and the X axis value of the marker being moved (in the same fundamental x-axis units).

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ACPower:MARKer:COUPle[:STATe]?`
Example	CALC:ACP:MARK:COUP ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**Marker**

Marker All Off

Turns all active markers off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer:AOFF`
Example	CALC:ACP:MARK:AOFF
Key Path	**Marker**

Peak Search

Accesses a menu that enables you to control the peak search function.

Key Path	**Front-panel key**

Peak Search

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:ACP:MARK2:MAX`
Key Path	**Peak Search**

Next Peak

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:ACP:MARK2:MAX:NEXT
Key Path	**Peak Search**

Next Pk Right

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:ACP:MARK2:MAX:RIGH
Key Path	**Peak Search**

Next Pk Left

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:ACP:MARK2:MAX:LEFT
Key Path	**Peak Search**

Marker Delta

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

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

Key Path	**Peak Search**

Continuous Peak Search

Turns **Continuous Peak Search** On or Off. When On, a peak search is automatically performed for the selected marker after each sweep. The rules for finding the peak are exactly the same as for **Peak Search** including the peak criteria rules. If no valid peak is found, the “No Peak Found” warning is generated after each sweep. If a valid peak is found, the message “Peak Found” is displayed after each sweep.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe] ON|OFF|1|0` `:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe]?`
Example	CALC:ACP:MARK:CPE ON
Preset	OFF
State Saved	Saved in instrument state.
Range	Off	On
Key Path	**Peak Search**

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:ACP:MARK:PTP
Restriction and Notes	Turns on the Marker Δ active function.
Dependencies/Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Key Path	**Peak Search**

Min Search

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:ACPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:ACP:MARK:MIN
Key Path	**Peak Search**

Marker To

There is no ‘Marker To’ functionality supported in ACP. The front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

There are no ‘Marker Functions’ supported in ACP. The front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

8 Spectrum Emission Mask

The spectrum emission mask measures spurious signal levels in up to six pairs of offset frequencies and relates them to the carrier power.

Key Path	**Meas**

Remote Command Results

Offsets that are turned off (inactive) will return –999.0 when their results are queried remotely.

`:CONFigure:SEMask`

`:INITiate:SEMask`

`:FETCh:SEMask[n]?`

`:MEASure:SEMask[n]?`

`:READ:SEMask[n]?`

N=1

In case the Meas Type is: Total Power Reference

Returns 82 comma-separated scalar results, in the following order:

1. Reserved for the future use, returns –999.0
2. Absolute power at the center frequency (reference) area (dBm)
3. Reserved for the future use, returns –999.0
4. Reserved for the future use, returns –999.0
5. Peak frequency in the center frequency (reference) area (Hz)
6. Reserved for the future use, returns –999.0
7. Reserved for the future use, returns –999.0
8. Reserved for the future use, returns –999.0
9. Reserved for the future use, returns –999.0
10. Reserved for the future use, returns –999.0
11. Relative integrated power on the negative offset A (dBc)
12. Absolute integrated power on the negative offset A (dBm)
13. Relative peak power on the negative offset A (dBc)
14. Absolute peak power on the negative offset A (dBm)
15. Peak power offset frequency from the center frequency in the negative offset A (Hz)
16. Relative integrated power on the positive offset A (dBc)
17. Absolute integrated power on the positive offset A (dBm)

N=1	18. Relative peak power on the positive offset A (dBc)
(Continued)	19. Absolute peak power on the positive offset A (dBm)
	20.Peak power offset frequency from the center frequency in the positive offset A (Hz)
	21. Relative integrated power on the negative offset B (dBc)
	...
	69. Absolute peak power on the positive offset F (dBm)
	70.Peak power offset frequency from the center frequency in the positive offset F (Hz)71. Minimum margin from limit line on the negative offset A (dB)
	72. Minimum margin from limit line on the positive offset A (dB)
	73. Minimum margin from limit line on the negative offset B (dB)
	74. Minimum margin from limit line on the positive offset B (dB)
	75. Minimum margin from limit line on the negative offset C (dB)
	76. Minimum margin from limit line on the positive offset C (dB)
	77. Minimum margin from limit line on the negative offset D (dB)
	78. Minimum margin from limit line on the positive offset D (dB)
	79. Minimum margin from limit line on the negative offset E (dB)
	80. Minimum margin from limit line on the positive offset E (dB)
	81. Minimum margin from limit line on the negative offset F (dB)
	82. Minimum margin from limit line on the positive offset F (dB)

N=1

(Continued)

In case the Meas Type is: Power Spectral Density Reference

Returns 82 comma-separated scalar results, in the following order:

1. Reserved for the future use, returns –999.0
2. Absolute power at the center frequency (reference) area (dBm)
3. Reserved for the future use, returns –999.0
4. Reserved for the future use, returns –999.0
5. Peak frequency in the center frequency (reference) area (Hz)
6. Reserved for the future use, returns –999.0
7. Reserved for the future use, returns –999.0
8. Reserved for the future use, returns –999.0
9. Reserved for the future use, returns –999.0
10. Reserved for the future use, returns –999.0
11. Relative integrated power on the negative offset A (dB). Returns –999.0 if in WLAN.
12. Absolute integrated power on the negative offset A (dBm/Hz). Returns –999.0 if in WLAN.
13. Relative peak power on the negative offset A (dB)
14. Absolute peak power on the negative offset A (dBm/Hz)
15. Peak power offset frequency from the center frequency in the negative offset A (Hz)
16. Relative integrated power on the positive offset A (dB). Returns –999.0 if in WLAN.
17. Absolute integrated power on the positive offset A (dBm/Hz). Returns –999.0 if in WLAN.
18. Relative peak power on the positive offset A (dB)
19. Absolute peak power on the positive offset A (dBm/Hz)
20. Peak power offset frequency from the center frequency in the positive offset A (Hz)
21. Relative integrated power on the negative offset B (dB). Returns –999.0 if in WLAN.

...

N=1	69. Absolute peak power on the positive offset F (dBm/Hz)
(Continued)	70.Peak power offset frequency from the center frequency in the positive offset F (Hz)71. Minimum margin from limit line on the negative offset A (dB)
	72. Minimum margin from limit line on the positive offset A (dB)
	73. Minimum margin from limit line on the negative offset B (dB)
	74. Minimum margin from limit line on the positive offset B (dB)
	75. Minimum margin from limit line on the negative offset C (dB)
	76. Minimum margin from limit line on the positive offset C (dB)
	77. Minimum margin from limit line on the negative offset D (dB)
	78. Minimum margin from limit line on the positive offset D (dB)
	79. Minimum margin from limit line on the negative offset E (dB)
	80. Minimum margin from limit line on the positive offset E (dB)
	81. Minimum margin from limit line on the negative offset F (dB)
	82. Minimum margin from limit line on the positive offset F (dB)
N=2	Returns the displayed frequency domain spectrum trace data
	separated by comma. The number of data is 2001.
N=3	Returns the displayed frequency domain absolute limit trace
	data separated by comma. The number of data is determined 2001.
N=4	Returns the displayed frequency domain relative limit trace
	data separated by comma. The number of data is 2001.
N=5	In case the Meas Type is: Total Power Reference
	Returns 14 comma-separated scalar values (in dBm) of the absolute integrated power of the segment frequencies:
	1. Total power reference (dBm)
	2. Reserved for the future use, returns –999.0
	3. Absolute integrated power at negative offset frequency (A)
	4. Absolute integrated power at positive offset frequency (A)
	...
	13. Absolute integrated power at negative offset frequency (F)
	14. Absolute integrated power at positive offset frequency (F)

N=5 In case the Meas Type is: Power Spectral Density Reference

Returns 14 comma-separated scalar values (in dBm/Hz) of the absolute integrated power of the segment frequencies. Returns –999.0 for the offsets if in WLAN:

1. Power spectral density reference (dBm/Hz)

2. Reserved for the future use, returns –999.0

3. Absolute integrated power at negative offset frequency (A)

4. Absolute integrated power at positive offset frequency (A)

...

13. Absolute integrated power at negative offset frequency (F)

14. Absolute integrated power at positive offset frequency (F)

N=6 In case the Meas Type is: Total Power Reference

Returns 14 comma-separated scalar values (in dBc) of the integrated power relative to the carrier at the segment frequencies:

1. Reserved for the future use, returns –999.0

2. Reserved for the future use, returns –999.0

3. Relative integrated power at negative offset frequency (A)

4. Relative integrated power at positive offset frequency (A)

...

13. Relative integrated power at negative offset frequency (F)

14. Relative integrated power at positive offset frequency (F)

N=6 In case the Meas Type is: Power Spectral Density Reference

Returns 14 comma-separated scalar values (in dBc/Hz) of the integrated power relative to the carrier at the segment frequencies. Returns –999.0 for the offsets if in WLAN:

1. Reserved for the future use, returns –999.0

2. Reserved for the future use, returns –999.0

3. Relative integrated power at negative offset frequency (A)

4. Relative integrated power at positive offset frequency (A)

...

13. Relative integrated power at negative offset frequency (F)

14. Relative integrated power at positive offset frequency (F)

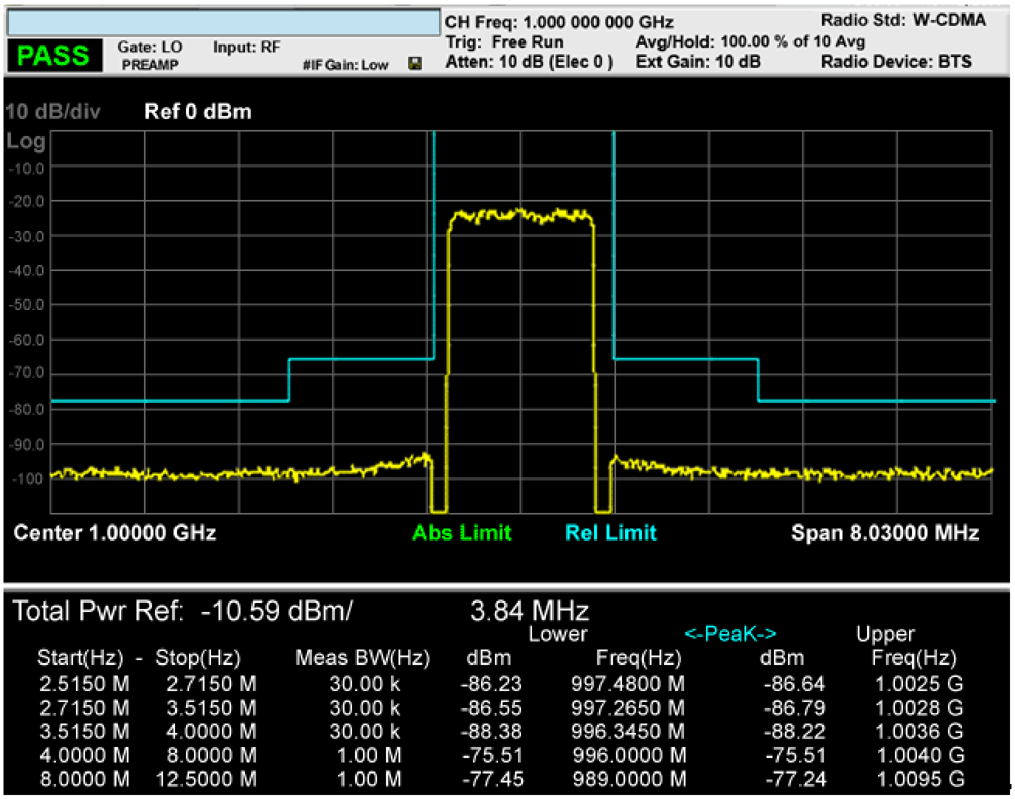
N=7	Returns 14 comma-separeted pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) ... 13. At negative offset frequency (F) 14. At positive offset frequency (F)
N=8	Returns 14 comma-separeted pass/fail test results (0=passed, or 1=failed) determined by testing the minimum margin point from the limit line that is determined each offset's Limits setting. Note: This result(N=8) is same as N=7 result. 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) ... 13. At negative offset frequency (F) 14. At positive offset frequency (F)
N=9	Returns 14 comma-separated scalar values of frequency (in Hz) that have peak power in each offset: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. Negative offset frequency (A) 4. Positive offset frequency (A) ... 13. Negative offset frequency (F) 14. Positive offset frequency (F)

N=10	Returns 14 comma-separated scalar values (in dBm) of the absolute peak power of the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) ... 13. At negative offset frequency (F) 14. At positive offset frequency (F)
N=11	Returns 14 comma-separated scalar values in dBc (dB if MeasType = PSD) of the peak power relative to the carrier at the segment frequencies: 1. Reserved for the future use, returns –999.0 2. Reserved for the future use, returns –999.0 3. At negative offset frequency (A) 4. At positive offset frequency (A) ... 13. At negative offset frequency (F) 14. At positive offset frequency (F)
N=12	Returns the band power result (the peak power of the signal in the ref channel) when in WLAN standard. If not in WLAN standard the value returned will be –999.0 Note: This result (N=12) is available only in Spectrum Analysis mode.

Measurement Results and Views

The following graphics display Total Pwr Ref, PSD Ref, and WLAN results and data.

Display - Abs Peak Pwr & Freq (Total Pwr Ref)



Trace Window

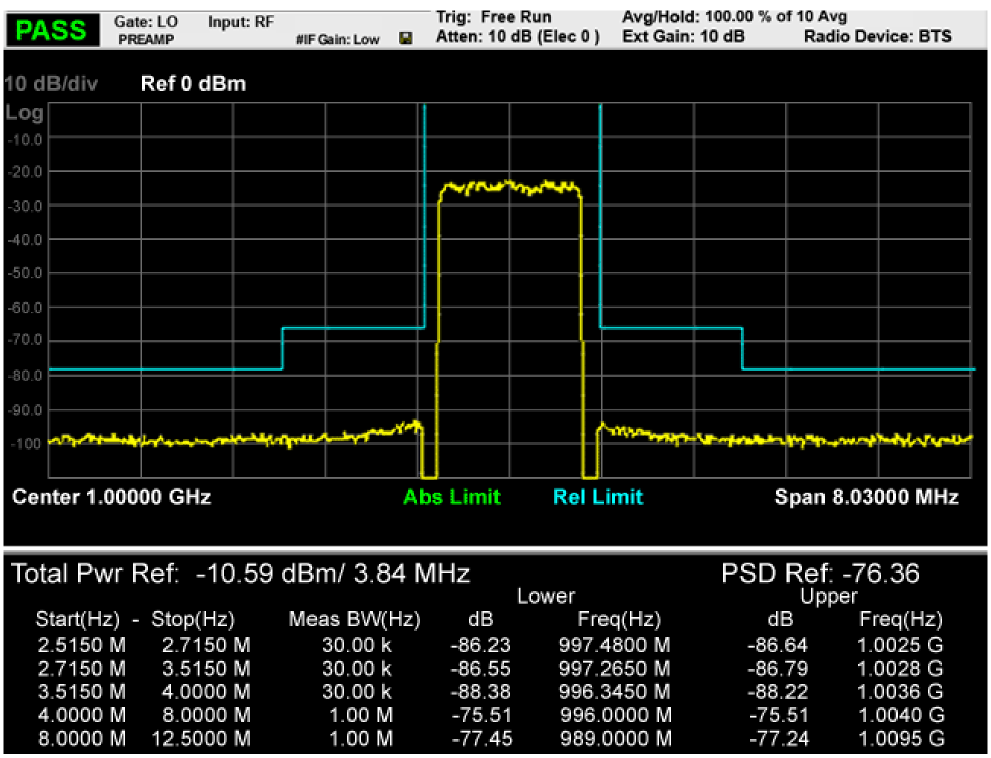
Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area. Channel Integration Bandwidth

Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset
Lower Peak(dBm)	Absolute peak power on minimum margin point of the negative offset
Lower Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq(Hz)	Frequency on minimum margin point of the negative offset
Upper Peak(dBm)	Absolute peak power on minimum margin point of the positive offset
Upper Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq(Hz)	Frequency on minimum margin point of the positive offset

Display - Abs Peak Pwr & Freq (PSD Ref)



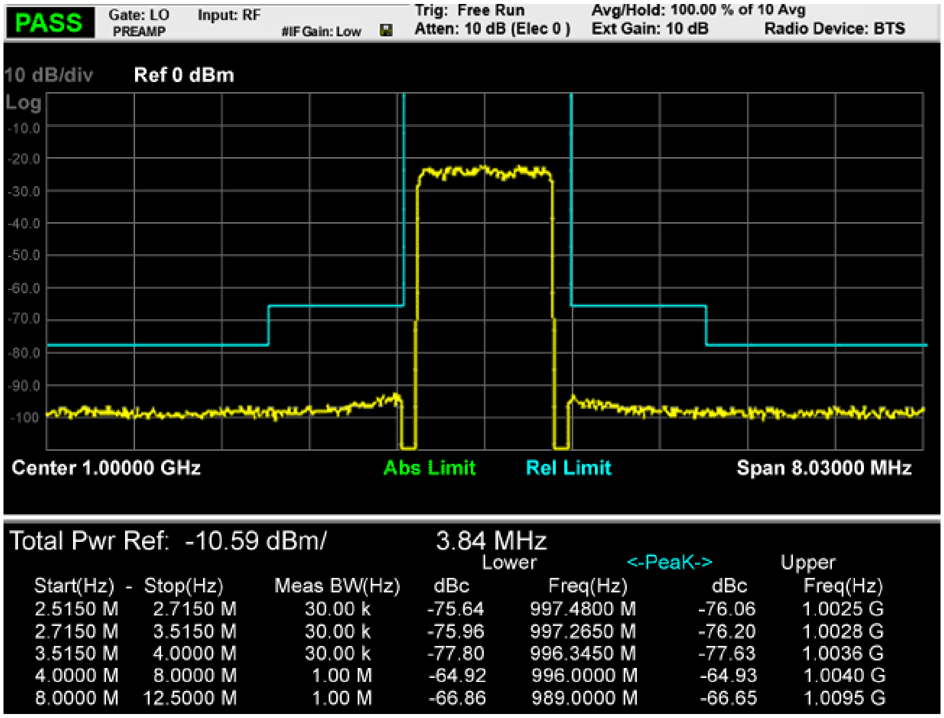
Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area. Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset
Lower(dBm/Hz)	Absolute peak power on minimum margin point of the negative offset
Lower Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq(Hz)	Frequency on minimum margin point of the negative offset
Upper(dBm/Hz)	Absolute peak power on minimum margin point of the positive offset
Upper Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq(Hz)	Frequency on minimum margin point of the positive offset

Display - Rel Peak Pwr & Freq (Total Pwr Ref)



Trace Window

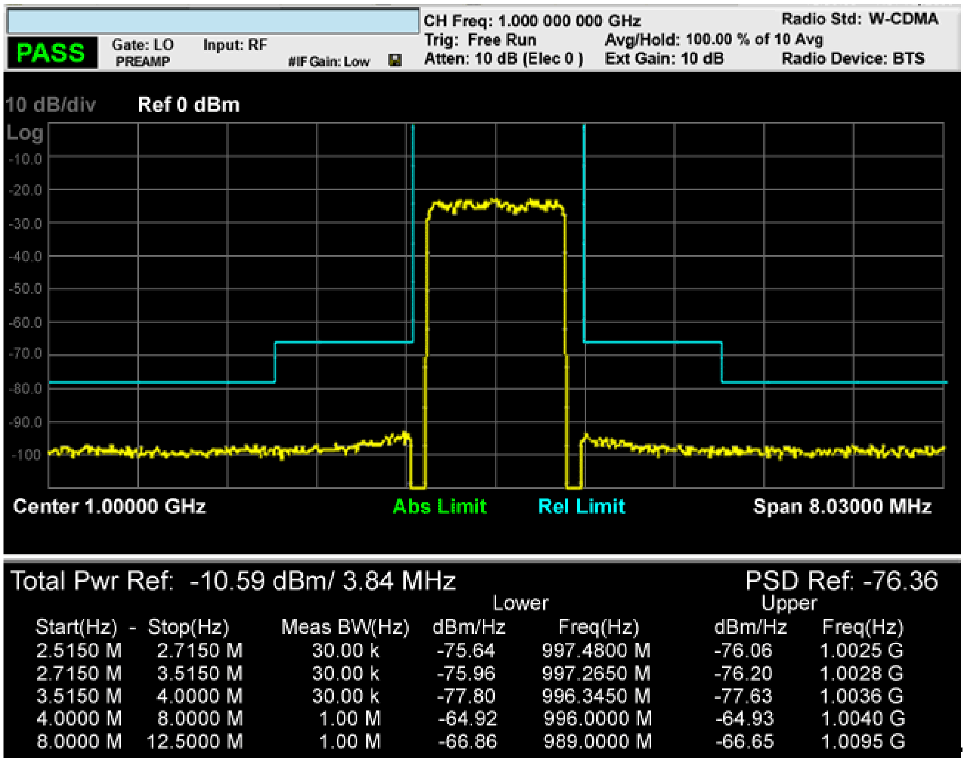
Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area. Channel Integration Bandwidth
Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset
Lower Peak(dBc)	Relative peak power on minimum margin point of the negative offset
Lower Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset

Lower Freq(Hz)	Frequency on minimum margin point of the negative offset
Upper Peak(dBc)	Relative peak power on minimum margin point of the positive offset
Upper Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq(Hz)	Frequency on minimum margin point of the positive offse

Display - Rel Peak Pwr & Freq (PSD Ref)



Trace Window

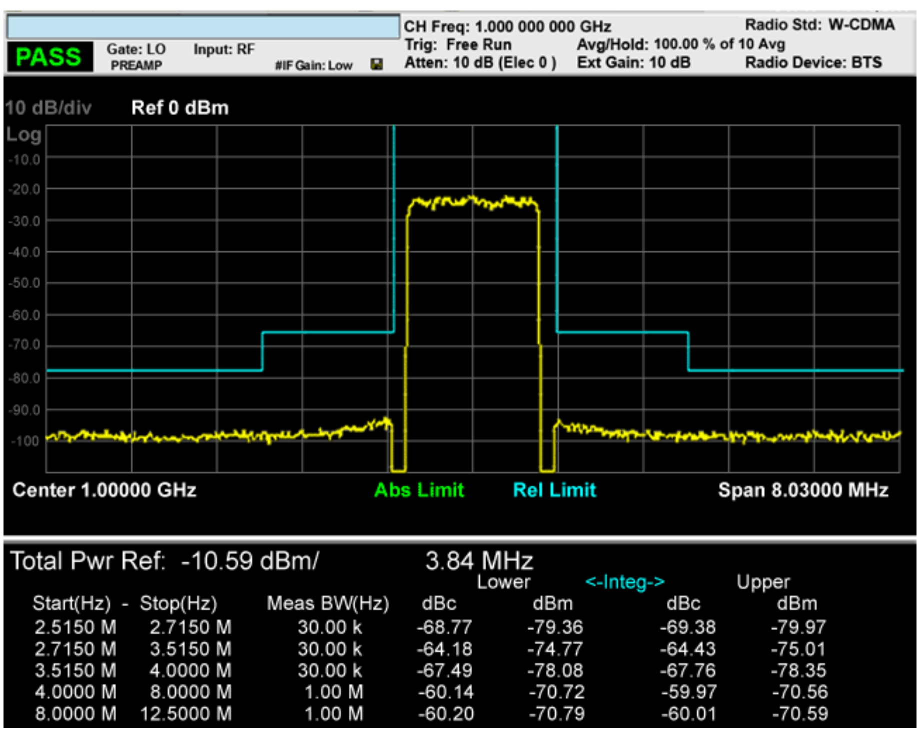
Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area.

	Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset
Lower(dB)	Relative peak power on minimum margin point of the negative offset
Lower Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower Freq(Hz)	Frequency on minimum margin point of the negative offset
Upper(dB)	Relative peak power on minimum margin point of the positive offset
Upper Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset
Upper Freq(Hz)	Frequency on minimum margin point of the positive offset

Display - Integrated Power (Total Pwr Ref)



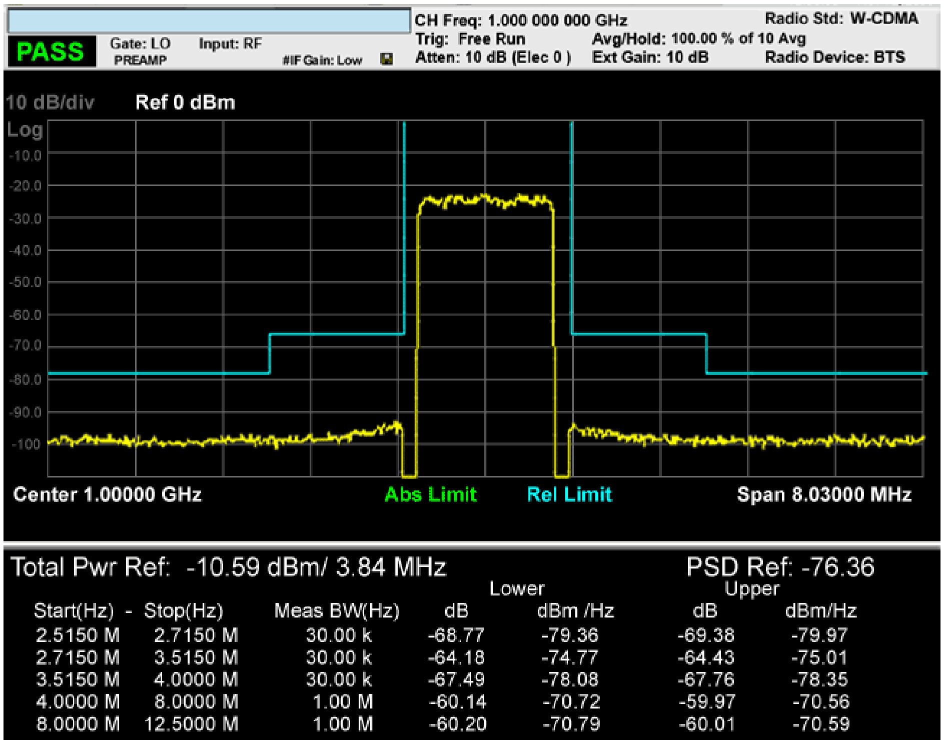
Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area. Channel Integration Bandwidth
Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset
Lower Integ(dBc)	Relative integrated power on the negative offset
Lower Integ(dBm)	Absolute integrated power on the negative offset
Upper Integ(dBc)	Relative integrated power on the positive offset
Upper Integ(dBm)	Absolute integrated power on the positive offset

Display - Integrated Power (PSD Ref)



Trace Window

Corresponding Trace	yellow - Combined trace from carrier and each offset

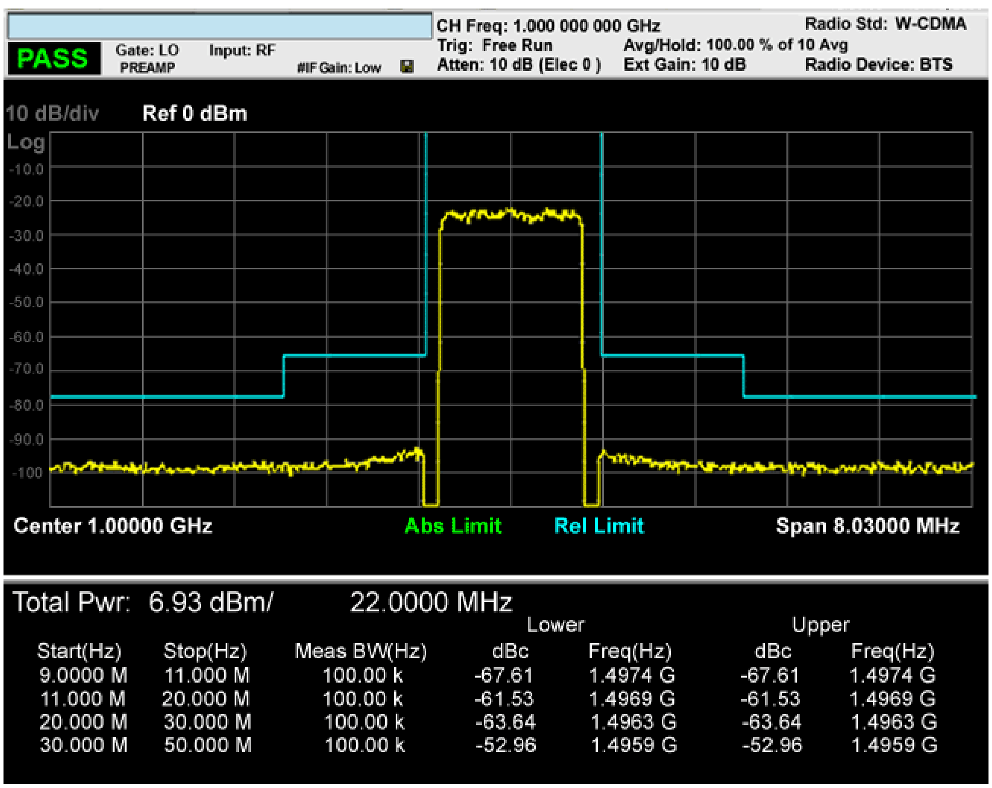
Results Window

Name	Corresponding Results
Total Pwr Ref	n=1 2nd element Absolute power at the reference area. Channel Integration Bandwidth
PSD Ref	n=5 1st element Power spectral density reference at the reference area
Start(Hz)	Start frequency for offset
Stop(Hz)	Stop frequency for offset
Meas BW(Hz)	Measurement bandwidth for offset

Lower(dB)	Relative integrated power on minimum margin point of the negative offset
Lower Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the negative offset
Lower(dBm/Hz)	Absolute integrated power on minimum margin point of the negative offset
Upper(dB)	Relative integrated power on minimum margin point of the positive offset
Upper Lim(dB)	Minimum margin from limit line which is decided by Fail Mask setting on the positive offset

Display - Integrated Power (WLAN)

WLAN screen. Note the labelling changes. “Total Pwr Ref” has changed to “Total Pwr” and the “PSD Ref”, has changed to “Peak PSD Ref”



Span X Scale

Span X Scale functionality is not supported in Spectrum Emission Mask, so this front panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values and Internal Preamp selections that are measurement global.

Key Path	**Front-panel key**

Ref Value

Sets the value for the absolute power reference. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:RLEV 100 DISP:SEM:VIEW:WIND:TRAC:Y:RLEV?
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 changed to Off.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10.0 dBm
State Saved	Saved in instrument state.
Min	–250 dBm
Max	250 dBm
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, Attenuation in the “Analyzer Setup Functions” section for more information.

Scale/Div

Sets the units-per-divisiion of the vertical scale in the logarithmic display. When Auto Scaling is On, the scale per division value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:PDIV 15dB DISP:SEM:VIEW:WIND:TRAC:Y:PDIV?
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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	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.

Ref Position

Positions the reference level at the top, center or bottom of the Y scale display. Changing the reference position does not affect the reference level value.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:RPOS BOTT DISP:SEM:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off.

When Auto Scaling is On and the Restart front-panel key is pressed, the analyzer automatically determines the scale per division and reference values based on the measurement results. When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|ON|OFF` `:DISPlay:SEMask:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:SEM:VIEW:WIND:TRAC:Y:COUP OFF DISP:SEM:VIEW:WIND:TRAC:Y:COUP?
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 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 Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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**

View/Display

Accesses a menu of functions that enable you to control the instrument display.

Key Path	**Front-panel key**

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 will remain 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.

Mode	WCDMA
Remote Command	:DISPlay:SEMask:ANNotation:TITLe:DATA <string>
	:DISPlay:SEMask:ANNotation:TITLe:DATA?
Example	DISP:SEM:ANN:TITL:DATA “Spectrum Emission Mask”
	DISP:SEM:ANN:TITL:DATA?
Preset	Spectrum Emission Mask
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Display

The following keys select how the results are displayed:

Abs Pwr Freq-displays the absolute power levels in dBm and the corresponding frequencies in the text window.

Rel Pwr Freq-displays the relative power levels in dBc and the corresponding frequencies in the text window.

Integrated Power-displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SEMask:VIEW[:SELect] APFReq|RPFReq|IPOWer`
	`:DISPlay:SEMask:VIEW[:SELect]?`

Example	DISP:SEM:VIEW IPOW DISP:SEM:VIEW?
Restriction and Notes	In SA mode, when "Radio Standard" is set to WLAN, IPOWer is not available. IPOWer key is grayed out.
Dependencies/Couplings	In SA mode, when "Radio Standard" is set to WLAN, IPOWer is not available. IPOWer key is grayed out.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	APFReq
State Saved	Saved in instrument state.
Range	Abs Pwr & Freq | Rel Pwr & Freq | Integrated Power
Key Path	**View/Display**

Display (Remote Command Only)

The following numerical selections select how the results are displayed:

2- displays the absolute power levels in dBm and the corresponding frequencies in the text window.

3- displays the relative power levels in dBc and the corresponding frequencies in the text window.

4- displays the absolute and relative power levels integrated throughout the bandwidths between the start and stop frequencies in the text window.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SEMask:VIEW:NSELect <integer>` `:DISPlay:SEMask:VIEW:NSELect?`
Example	DISP:SEM:VIEW:NSEL 2 DISP:SEM:VIEW:NSEL?
Restriction and Notes	In SA mode, when "Radio Standard" is set to WLAN, 3 is not available.
Dependencies/Couplings	In SA mode, when "Radio Standard" is set to WLAN, 3 is not available.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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 Lines

Toggles the limit lines display function for the spectrum emission mask measurements On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:LLINe:STATe ON|OFF|1|0`
	`:CALCulate:SEMask:LLINe:STATe?`
Example	CALC:SEM:LLIN:STAT OFF
	CALC:SEM:LLIN:STAT?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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

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.

- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- 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.
- Negative Peak-the detector determines the minimum of the signal within the sweep points.

Key Path	**Front-panel key**

Segment Select

Selects either the reference channel or the offset reference for the detector trace.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Preset	Ref Channel
State Saved	Saved in instrument state.
Range	Ref Channel | Offset
Key Path	**Trace/Detector**

Ref Channel

Selects the detector mode for the reference channel.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:DETector:CARRier[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:SEMask:DETector:CARRier[:FUNCtion]?`
Example	SEM:DET:CARR NEG SEM:DET:CARR?

Restriction and Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. Note: This detector setting affects the reference channel. There is not a per trace detector.
Dependencies/Couplings	When the Detector choice is Auto, the selected detector goes to the default value for each mode or radio standard.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak
Key Path	**Trace/Detector**

Offset

Selects the detector mode for the offsets.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:DETector:OFFSet[:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:SEMask:DETector:OFFSet[:FUNCtion]?`
Example	SEM:DET:OFFS AVER SEM:DET:OFFS?
Restriction and Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. Note: This detector setting has effects all offsets. There is not a per trace detector.
Dependencies/Couplings	When the Detector choice is Auto, the selected detector goes to the default value for each mode or radio standard.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA, WCDMA, C2K: POSitive WiMAX OFDMA: AVERage
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak

Key Path	**Trace/Detector**

Auto (Ref Channel)

Sets the detector to the default detection mode for the reference channel. This mode is dependent upon the current reference channel conditions.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:DETector:CARRier:AUTO ON|OFF|1|0` `[:SENSe]:SEMask:DETector:CARRier:AUTO?`
Example	SEM:DET:CARR:AUTO OFF SEM:DET:CARR:AUTO?
Restriction and Notes	When the Detector choice is Auto, the selected detector goes to the default value for each mode or radio standard.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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	**Trace/Detector**

Auto (Offset)

Sets the detector to the default detection mode for the offsets. This mode is dependent upon the current signal conditions of the offsets.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:DETector:OFFSet:AUTO ON|OFF|1|0` `[:SENSe]:SEMask:DETector:OFFSet:AUTO?`
Example	SEM:DET:OFFS:AUTO OFF SEM:DET:OFFS:AUTO?
Restriction and Notes	When the Detector choice is Auto, the selected detector goes to the default value for each mode or radio standard.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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	**Trace/Detector**

BW

This key is unavailable in this mode. The BW key will display a blank key menu when pressed.

Key Path	**Front-panel key**

Meas Setup

Displays the setup menu for the currently selected measurement.

Key Path	**Front-panel key**

Avg/Hold Num

Toggles averaging On or Off in additon to enabling you to set the number of measurement averages used to calculate the measurement result. The average will be displayed at the end of each sweep.

In remote mode, use the Average State command to turn averaging on or off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	SEM:AVER:COUN 100 SEM:AVER:COUN? SEM:AVER ON SEM:AVER?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	10, , 0FF
State Saved	Saved in instrument state.
Min	1
Max	10000
Key Path	**Meas Setup**

Meas Type

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

Total Pwr Ref – Sets the reference to the total carrier power and the measured data is shown in dBc and dBm.

PSD Ref – Sets the reference to the mean power spectral density of the carrier and the measured data is shown in dB and dBm/Hz.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:TYPE PSDRef|TPRef` `[:SENSe]:SEMask:TYPE ?`
Example	SEM:TYPE PSDR SEM:TYPE?
Restriction and Notes	In SA mode, when "Radio Standard" is set to WLAN, Total Pwr Ref is not available. Meas Type is set to PSD Ref and this key is grayed out.
Dependencies/Couplings	Total Pwr Ref is not available for WLAN. Meas Type is set to PSD Ref and this key is grayed out.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	TPRef
State Saved	Saved in instrument state.
Range	Total Pwr Ref|PSD Ref
Key Path	**Meas Setup**

Ref Channel

Accesses a menu that enables you to set up the measurement parameters used to calculate the power in the reference channel.

Key Path	**Meas Setup, Ref Channel**

Integ BW

Specifies the integration bandwidth used to calculate the power in the reference channel.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2:INTegration <bandwidth>` `[:SENSe]:SEMask:BANDwidth[1]|2:INTegration?`
Example	SEM:BAND:INT 10 MHz SEM:BAND:INT?
Restriction and Notes	10% .. 100% of Channel Span Parameter Value

Dependencies/Couplings	Cannot be higher than the channel Span.and if it is lower than 1/10 of channel Span, then the channel Span is reduced to be 10 times the Integ BW.
Remote Command Notes	Bandwidth subopcode, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 3.84 MHz WCDMA: 3.84 MHz | 3.84 MHz C2K: 1.23 MHz | 1.23 MHz WiMAX OFDMA: 10 MHz | 10 MHz
State Saved	Saved in instrument state.
Min	100.0 kHz
Max	50 MHz
Key Path	**Meas Setup, Ref Chan**

Span

Specifies the span used to calculate the power in the reference channel.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:FREQuency[1]|2:SPAN <freq>` `[:SENSe]:SEMask:FREQuency[1]|2:SPAN?`
Example	SEM:FREQ:SPAN 3MHz SEM:FREQ:SPAN?
Dependencies/Couplings	Range 1 kHz to 50 MHz (although restricted by Integ BW). If you set the channel Span lower than channel Integ BW, they will both track each other. As you increase the channel Span, the Integ BW will also increase if it is less then 1/10 of the channel Span.
Remote Command Notes	Frequency subopcode, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 5.0 MHz WCDMA: 5.0 MHz | 5.0 MHz C2K: 1.25 MHz | 1.25 MHz WiMAX OFDMA: 10 MHz | 10 MHz
State Saved	Saved in instrument state.

Min	1 kHz
Max	50 MHz
Key Path	**Meas Setup, Ref Chan**

Sweep Time

Sets the sweep time used to calculate the power in the reference channel. Sweep Time can be set manually or put in auto mode.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:SEMask:SWEep[1]|2:TIME <time>`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME?`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO OFF|0|ON|1`
	`[:SENSe]:SEMask:SWEep[1]|2:TIME:AUTO?`

Example	SEM:SWE:TIME 9ms SEM:SWE:TIME? SEM:SWE:TIME:AUTO OFF SEM:SWE:TIME:AUTO?
Dependencies/Couplings	When the Sweep Time is set manually, Auto is set to OFF When set to auto the Sweep Time is automatically calculated
Remote Command Notes	Sweep Time subopcode, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: Auto WCDMA: 3.4 ms C2K: 1 ms WiMAX OFDMA: 1 ms, , SA:ON WCDMA, C2K, WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Min	1 ms
Max	10 s
Key Path	**Meas Setup, Ref Chan**

Res BW

Sets the resolution bandwidth used to calculate the power in the reference channel. The Channel

Resolution BW can be set manually or put in to auto mode.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution] <bandwidth>`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]?`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO OFF|ON|1|0`
	`[:SENSe]:SEMask:BANDwidth[1]|2[:RESolution]:AUTO?`

Example	SEM:BAND 100 kHz SEM:BAND? SEM:BAND:AUTO ON SEM:BAND:AUTO?
Dependencies/Couplings	When Res BW is set manually, Mode coupling is set to MANual The resolution bandwidth is coupled to the Span and the Span/RBW ratio setting
Remote Command Notes	Bandwidth subopcode, 1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 100 kHz WCDMA: 75 kHz C2K: 24.6 kHz WiMAX OFDMA: 100 KHz, , OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**Meas Setup, Ref Chan**

Total Pwr Ref

Sets the power in the carrier (ref channel) that will be used to compute the relative power values for the offsets. When the carrier power state is set to auto, this is set to the measured carrier reference power. When set to manual, the result takes on the last measured value, or can be manually entered.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	SEM:CARR 100dBm SEM:CARR? SEM:CATT:AUTO OFF SEM:CATT:AUTO?
Restriction and Notes	The min and max values given are for Meas Type = Total Pwr Ref.
Dependencies/Couplings	This "Power Ref" parameter is coupled with the "Meas Type" parameter. The softkey will be labeled with "Total Pwr Ref" and the information entered in this table is only valid if the "Meas Type" is set to "Total Pwr Ref (TPRef)" (which is the default setting).
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	Measured carrier reference power
State Saved	Yes if Mode set to MAN.
Min	–200 dBm
Max	200 dBm
Key Path	**Meas Setup, Ref Chan**

PSD Ref

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

Mode	SA, WCDMA, C2K , WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:CARRier:CPSD <real>` `[:SENSe]:SEMask:CARRier:CPSD?`
Example	SEM:CARR:CPSD –80 SEM:CARR:CPSD?
Dependencies/Couplings	This "PSD Ref" parameter is coupled with the "Meas Type" parameter. The softkey will be labeled with "PSD Ref" and the information entered in this table is only valid if the "Meas Type" is set to "PSD Ref".

Remote Command Notes	Although the default value is defined, the value is recalculated by the measurement result just after completing the measurement. Carrier subopcode. 1 for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	Measured carrier reference power
State Saved	Yes if Mode is set to MAN.
Min	–900
Max	900
Key Path	**Meas Setup, Ref Channel**

Offsets/Limits

Accesses a menu that enables you to set up the measurement parameters for the offset pairs. For example, you can assign the start and stop frequencies, select the resolution bandwidth, and set the sweep time.

Key Path	**Meas Setup, Offsets/Limits**

Offset

Selects the offset pairs (upper and lower) that affect the menu keys, and displays the memory selection menu from A to F. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Start Freq, Stop Freq, Sweep Time, Res BW, Meas BW, Abs Start, and Abs Stop. Press Offset until the letter of the desired offset (A, B, C, D, E, or F) is underlined. Only one selection at a time is shown on this menu key label.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Preset	A
Range	A | B | C | D | E | F
Key Path	**Meas Setup, Offsets/Limits**

Start Freq

Specifies the start frequency for the currently selected offset and enables you to toggle this function On or Off for each offset.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STARt <freq>,<freq>, <freq>, <freq>, <freq>, <freq>`
	
	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STARt?`

Example	SEM:OFFS2:LIST:FREQ:STAR 100 kHz SEM:OFFS2:LIST:FREQ:STAR? SEM:OFFS:LIST:STAT ON SEM:OFFS:LIST:STAT?
Dependencies/Couplings	Coupled to Stop Freq. Start cannot go above the stop freq less 100Hz. Similarly Stop freq cannot go below Start Freq plus 100Hz.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz WCDMA: 2.515 MHz, 2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz|2.515MHz, 4.000 MHz, 7.500 MHz, 8.500 MHz, 12.5 MHz, 15 MHz C2K: 765.0 kHz, 795.0 kHz, 1.195 MHz, 3.2531 MHz, 7.500 MHz, 7.5 MHz|900.0 kHz, 1.995 MHz, 2.2531 MHz, 8.500 MHz, 12.50 MHz, 12.5 MHz WiMAX OFDMA: 10kHz, 4.75 MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz|10kHz, 4.75 MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz SA: ON, ON, ON, ON, ON, OFF WCDMA: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, OFF, OFF C2K: ON, ON, ON, OFF, OFF, OFF|ON, ON, OFF, OFF, OFF, OFF WiMAX OFDMA: ON, ON, ON, ON, OFF, OFF|ON, ON, ON, ON, OFF, OFF
State Saved	Saved in instrument state.
Min	10 kHz
Max	Stop Freq minus (-) 100 Hz (for that offset)
Key Path	**Meas Setup, Offset/Limits**

<table>
<tr><td>BAF SCPI Command</td><td>[:SENSe]:SEMask:OFFSet[1]|2:LIST:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0

[:SENSe]:SEMask:OFFSet[1]|2:LIST:STATe?</td></tr>
</table>

Stop Freq

Specifies the stop frequency for the currently selected offset.

<table>
<tr><td>Mode</td><td>SA, WCDMA, C2K, WiMAX OFDMA</td></tr>
<tr><td>Remote Command</td><td><code>[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STOP <freq>, <freq>, <freq>, <freq>, <freq>, <freq></code>

<code>[:SENSe]:SEMask:OFFSet[1]|2:LIST:FREQuency:STOP?</code></td></tr>
<tr><td>Example</td><td>SEM:OFFS:LIST:FREQ:STOP 100 kHz

SEM:OFFS:LIST:FREQ:STOP?</td></tr>
<tr><td>Dependencies/Couplings</td><td>Coupled to Start Freq. Start cannot go above the stop freq less 100Hz. Similarly Stop freq cannot go below Start Freq plus 100Hz.</td></tr>
<tr><td>Remote Command Notes</td><td>Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS.

You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.</td></tr>
<tr><td>Preset</td><td>SA: 2.715 MHz, 3.515 MHz, 4.00 MHz, 8.00 MHz, 12.50 MHz, 15.0 MHz

WCDMA:2.715 MHz, 3.515 MHz, 4.000 MHz, 8.000 MHz, 12.50 MHz, 15.0 MHz|3.485 MHz, 7.500 MHz, 8.500 MHz, 12.00 MHz, 15.00 MHz, 18.0 MHz

C2K: 795.0 kHz, 1.195 MHz, 4.015 MHz, 4.0031 MHz, 12.50 MHz, 12.5 MHz|1.995 MHz, 4.015 MHz, 4.0031 MHz, 12.00 MHz, 15.00 MHz, 15.0 MHz

WiMAX OFDMA: 4.75MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75MHz, 24.75MHz|4.75MHz, 5.45 MHz, 9.75 MHz, 14.75 MHz, 19.75 MHz, 24.75 MHz</td></tr>
<tr><td>State Saved</td><td>Saved in instrument state.</td></tr>
<tr><td>Min</td><td>Start Freq plus (+) 100 Hz (for that offset)</td></tr>
<tr><td>Max</td><td>500 MHz</td></tr>
<tr><td>MIN/MAX/DEF Support</td><td>Yes</td></tr>
<tr><td>Key Path</td><td>Meas Setup, Offset/Limits</td></tr>
</table>

Relative Atten

Sets the attenuation value used to adjust the relative level limits ranging.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:RATTenuation <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:RATTenuation?`
Example	SEM:OFFS2:LIST:RATT –10 dB SEM:OFFS2:LIST:RATT?
Remote Command Notes	OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB | 0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB, 0.0 dB
State Saved	Saved in instrument state.
Min	–40.0 dB
Max	0.0 dB
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits**

Offset Side

Specifies which offset side to measure.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SIDE BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:SIDE?`
Example	SEM:OFFS:LIST:SIDE BOTH SEM:OFFS:LIST:SIDE?
Remote Command Notes	OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA 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

State Saved	Saved in instrument state.
Range	Neg | Both | Pos
Key Path	**Meas Setup, Offset/Limits**

Meas BW

Specifies the value used when measuring the currently selected offset. The Meas BW value is the multiplier applied to the Res BW to define the bandwidth to integrate over when calculating the power for the offsets.

When an offset has the multiplier set to > 1, the algorithm used to calculate the peak power for that offset requires the number of trace points to be 100 per Meas BW (multplier x Res BW). The number of trace points is therefore calculated using;

Trace Points = (Offset Stop Freq - Offset StartFreq) / (Meas BW / 100)

When the offset has a multiplier = 1, the number of trace points are equal to the Meas BW value.

Using a Meas BW which is different from the Res BW can increase the dynamic range, but also increses the number of sweep points, resulting in an incresed sweep time.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:IMULti <integer>, <integer>, <integer>, <integer>, <integer>, <integer>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:IMULti?`
Example	SEM:OFFS2:LIST:BAND:IMUL 1,1,1,1,1,1 SEM:OFFS2:LIST:BAND:IMUL?
Dependencies/Couplings	This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the Res Bw is changed, the multiplier will be changed to ensure this.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 1, 1, 1, 1, 1, 1 WCDMA: 1, 1, 1, 10, 1, 1 | 1, 1, 1, 1, 1, 1 C2K: 10, 1, 1, 1, 1, 1 | 1, 1, 1, 1, 1, 1 WiMAX OFDMA: 1, 1, 1, 1, 1, 1 | 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	1

Max	1000
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits**

Sweep Time

Specifies the sweep time for the currently selected offset and enables you to toggle this function On or Off for each offset.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME <time>, <time>, <time>, <time>, <time>, <time>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME?`
Example	SEM:OFFS2:LIST:SWE:TIME 1.0 ms, 3.4 ms, 2.08 ms, 1.0 ms, 1.0 ms, 1.0 ms SEM:OFFS2:LIST:SWE:TIME? SEM:OFFS2:LIST:SWE:TIME:AUTO ON, ON, ON, ON, OFF, OFF SEM:OFFS2:LIST:SWE:TIME:AUTO?
Dependencies/Couplings	When the sweep time is set manually, Mode coupling is set to MANual
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: 1.00 ms, 3.80 ms, 2.33 ms, 1.00 ms, 1.00 ms, 1.00 ms WCDMA: 1.00 ms, 3.40 ms, 2.08 ms, 2.13 ms, 1.00 ms, 1.00 ms|4.6 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms WiMAX OFDMA: 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms|1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, 1.00 ms, , OFF,OFF,OFF,OFF,OFF| OFF,OFF,OFF,OFF,OFF
State Saved	Saved in instrument state.
Min	1 ms
Max	10 s
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits**

BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0 [:SENSe]:SEMask:OFFSet[1]|2:LIST:SWEep:TIME:AUTO?

Res BW

Specifies which Resolution BW filter to use when measuring the currently selected offset.

Offset Res BW Mode allows the instrument to determine the optimum Resolution BW filter to use when measuring the currently selected offset.. When changing the Meas BW parameter, if the Res BW needs to be changed to adhere to the rule

(N x Res BW) <= (Stop freq of the offset - Start freq of the offset),

where N is the multiplier, this setting will automatically be changed to manual.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution] <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>, <bandwidth>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]?`
Example	SEM:OFFS2:LIST:BAND 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz,1.00 MHz, 1.00 MHz SEM:OFFS2:LIST:BAND? SEM:OFFS:LIST:BAND:AUTO 1,1,1,1,1,1 SEM:OFFS:LIST:BAND:AUTO ?
Dependencies/Couplings	Coupled to Start and Stop offset and Meas BW multiplier. This parameter must adhere to the rule (N x Res BW) <= (Stop freq of the offset - Start freq of the offset), where N is the multiplier. If the multiplier is changed, the Res BW will be changed to ensure this. When set manually, Res BW Coupling is set to manual.
Remote Command Notes	Comma separated list of 6 values. subopcode OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode. OFFSet1 is for BTS, 2 for MS. Default is BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.00 MHz,1.00 MHz, 1.00 MHz WCDMA: 30.00 kHz, 30.00 kHz, 30.00 kHz, 100.00 kHz, 1.000 MHz, 1.00 MHz|30.00 kHz, 1.000 MHz, 1.000 MHz, 1.000 MHz, 1.000 MHz, 1.00 MHz C2K(BTS): 3.00 kHz, 30.00 kHz, 30.00 kHz, 6.25 kHz, 1.000 MHz, 1.00 MHz|30.00 kHz, 30.00 kHz, 6.25 kHz, 1.000 MHz, 1.000 MHz, 1.00 MHz WiMAX OFDMA: 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz| 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, 100 KHz, , OFF, OFF, OFF, OFF, OFF, OFF|OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**Meas Setup, Offset/Limits**
BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]:AUTO OFF|ON|1|0, OFF|ON|1|0, OFF|ON|1|0, OFF|ON|1|0, OFF|ON|1|0, OFF|ON|1|0 [:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth[:RESolution]:AUTO?

Video BW

Changes the analyzer post–detection filter.

Mode	SA, WCDMA, C2K, WIMAXOFFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo?`
Example	SEM:OFFS2:LIST:BAND:VID 3.00 kHz, 3.00 kHz, 3.00 kHz, 100.0 kHz,100.0 kHz, 100.0 kHz SEM:OFFS2:LIST:BAND:VID? SEM:OFFS2:LIST:BAND:VID:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:AUTO?
Remote Command Notes	Comma separated list of 6 values. subopcode OFFSet1is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: 30.0 kHz, 30.0 kHz, 30.0 kHz, 1.0 MHz,1.0 MHz, 1.0 MHz WCDMA: 30.0 kHz, 30.0 kHz, 30.0 kHz, 100.0 kHz, 1.0 MHz, 1.0 MHz|30.0 kHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz, 1.0 MHz C2K(BTS): 0.30 kHz, 3.00 kHz, 3.00 kHz, 0.625 kHz, 100.0 kHz, 100.0 kHz|3.00 kHz, 3.00 kHz, 0.625 kHz, 100.0 kHz, 100.0 kHz, 100.0 kHz WiMAX OFDMA: 30KHz, 30KHz, 30KHz, 30KHz, 30KHz, 30KHz| 30KHz, 30KHz, 30KHz, 30KHz, 30KHz, 30KHz, , SA, WCDMA, C2K: ON, ON, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON WiMAX OFDMA: OFF, OFF, OFF, OFF, OFF, OFF| OFF, OFF, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits**
BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:AUTO?

VBW/RBW

Selects the ratio between the video and resolution bandwidths.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio?`
Example	SEM:OFFS2:LIST:BAND:VID:RAT 0.1, 0.1, 0.1, 0.1, 0.1, 0.1 SEM:OFFS2:LIST:BAND:VID:RAT? SEM:OFFS2:LIST:BAND:VID:RAT:AUTO ON, ON, ON, ON, ON, ON SEM:OFFS2:LIST:BAND:VID:RAT:AUTO?
Dependencies/Couplings	When the Auto State is set to ON, the ratio is set to 0.1.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	1, 1, 1, 1, 1, 1|1, 1, 1, 1, 1, 1, , ON, ON, ON, ON, ON, ON|ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits**
BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SEMask:OFFSet[1]|2:LIST:BANDwidth:VIDeo:RATio:AUTO?

Limits

Accesses a menu that enables you to set the power limits for start and stop frequencies of the selected offsets.

Key Path	**Meas Setup, Limits**

Abs Start

Sets the absolute power level limit at the start frequency for the selected offset. The absolute power level limit ranges from –200 to +50 dBm.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:ABSolute <real>, <real>, <real>, <real>, <real>, <real> [:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:ABSolute?
Example	`SEM:OFFS2:LIST:STAR:ABS -12.50 dBm, -12.50 dBm, -24.50 dBm, -11.50 dBm, -11.50 dBm, -11.50 dBm` `SEM:OFFS2:LIST:STAR:ABS?`
Dependencies/Couplings	Coupled to Abs Stop if coupling set to “Couple”, that is,the Start value is equal to the Stop value.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: –14.00 dBm , –14.00 dBm , –26.00 dBm , –13.00 dBm , –13.00 dBm, –13.00 dBm WCDMA: –12.50 dBm, –12.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm | –69.6 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm C2K: –27.00 dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm | –70.13 dBm, –70.13 dBm, –35.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm WiMAX OFDMA: Refer to SA mode.
State Saved	Saved in instrument state.
Min	–200 dBm
Max	50 dBm
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits, Limits**

Abs Stop

Sets the absolute power level limit at the stop frequency for the selected offset. The absolute power level limit ranges from –200 to +50 dBm. You can also toggle this function between couple and manual. If set to Couple, the **Abs Stop** power level limit is coupled to **Abs Start** to result in a flat limit line. If set to Man, Abs Start and Abs Stop take different values to result in a sloped limit line.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute?`
Example	SEM:OFFS1:LIST:STOP:ABS –12.50 dBm, –24.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm SEM:OFFS1:LIST:STOP:ABS? SEM:OFFS1:LIST:STOP:ABS:COUP ON, OFF, ON, ON, ON, ON SEM:OFFS1:LIST:STOP:ABS:COUP?
Dependencies/Couplings	Coupled to Abs Start if coupling set to “Couple”, that is,the Stop value is equal to the Start value.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset	SA: –14.00 dBm, –26.00 dBm, –26.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm WCDMA: –12.50 dBm, –24.50 dBm, –24.50 dBm, –11.50 dBm, –11.50 dBm, –11.50 dBm | –69.6 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm, –54.3 dBm C2K: –27.00 dBm, –27.00 dBm, –27.00 dBm, –46.00 dBm, –13.00 dBm, –13.00 dBm | –70.13 dBm, –70.13 dBm, –35.00 dBm, –13.00 dBm, –13.00 dBm, –13.00 dBm WiMAX OFDMA: Refer to SA mode., , SA: ON, OFF, ON, ON, ON, ON WCDMA: ON, OFF, ON, ON, ON, ON | ON, ON, ON, ON, ON, ON C2K: ON, ON, ON, ON, ON, OFF | ON, ON, ON, ON, ON, OFF WiMAX OFDMA: Refer to SA mode.
State Saved	Saved in instrument state.
Min	–200 dBm
Max	50 dBm
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits, Limits**
BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute:COUPle ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0 [:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:ABSolute:COUPle?

Rel Start

Sets a relative power level limit at the start frequency for the selected offset. The relative power level limit ranges from –200 to +50 dBc.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:RCARrier <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:STARt:RCARrier?`
Example	SEM:OFFSet:LIST:STAR:RCAR –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB SEM:OFFSet:LIST:STAR:RCAR?
Restriction and Notes	See the following table for the default values for each Radio Standard.

Dependencies/Couplings
Coupled to Rel Stop is coupling set to “Couple”, that is, Start is made the same as Stop.

Remote Command Notes
Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS.

You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.

Preset
SA: –30.00 dB, –30.00 dB,–30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB

WCDMA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB | –33.73 dB, –34.00 dB, –37.50 dB, –47.50 dB, –47.50 dB, –47.50 dB

C2K: –45.00 dB, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB | –42.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB

WiMAX OFDMA: 0 dB, 0 dB, –25 dB, –32 dB, –50 dB, –50 dB | 0 dB, 0 dB, –25 dB, –32 dB, –50 dB, –50 dB

State Saved
Saved in instrument state.

Min
–200 dB

Max
50 dB

MIN/MAX/DEF Support
Yes

Key Path
Meas Setup, Offset/Limits, Limits

Rel Stop

Sets a relative power level limit at the stop frequency for the selected offset. The relative power level limit ranges from –200 to +50 dBc.

Mode
SA, WCDMA, C2K, WiMAX OFDMA

Remote Command

```
[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier
<rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>,
<rel_ampl>, <rel_ampl>
```

```
[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier?
```

Example
SEM:OFFSet:LIST:STOP:RCAR –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB

SEM:OFFSet:LIST:STOP:RCAR?

SEM:OFFSet:LIST:STOP:RCAR:COUP ON, ON, ON, ON, ON, ON

SEM:OFFSet:LIST:STOP:RCAR:COUP?

Restriction and Notes
See the following table for the default values for each Radio Standard.

Dependencies/Couplings	Coupled to Rel Start if coupling set to “Couple”, that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB WCDMA: –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB, –30.00 dB|–48.28 dB, –37.50 dB, –47.50 dB, –47.50 dB, –47.50 dB, –47.50 dB C2K: –45.00 dB, –45.00 dB, –55.00 dB, –55.00 dB, –55.00 dB, –55.00 dB|–42.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB, –54.00 dB WiMAX OFDMA: 0 dB, –25 dB, –32 dB, –50 dB, –50 dB, –50 dB| 0 dB, –25 dB, –32 dB, –50 dB, –50 dB, –50 dB, , SA: ON, OFF, ON, ON, ON, ON WCDMA: ON, ON, ON, ON, ON, ON|OFF, OFF, OFF, ON, ON, ON C2K: ON, ON, ON, ON, ON, OFF|ON, ON, ON, ON, ON, OFF WiMAX OFDMA: ON, OFF, OFF, OFF, ON, ON| ON, OFF, OFF, OFF, ON, ON
State Saved	Saved in instrument state.
Min	–200 dB
Max	50 dB
MIN/MAX/DEF Support	Yes
Key Path	**Meas Setup, Offset/Limits, Limits**
BAF SCPI Command	[:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier:COUPle ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0 [:SENSe]:SEMask:OFFSet[1]|2:LIST:STOP:RCARrier:COUPle?

Fail Mask

Selects one of the logic keys for fail conditions between the measurement results and the test limits:

Absolute and **Relative** both check the results against the respective limit.

OR checks against both limits, failing if either of the limits is broken.

AND will only display a fail if both of the limits are broken.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SEMask:OFFSet[1]|2:LIST:TEST ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative, ABSolute|AND|OR|RELative` `[:SENSe]:SEMask:OFFSet[1]|2:LIST:TEST?`
Example	SEM:OFFS:LIST:TEST ABS, ABS, ABS, ABS, ABS, ABS SEM:OFFS:LIST:TEST?
Remote Command Notes	Comma separated list of 6 values. OFFSet1 is for BTS, 2 for MS. Default is BTS. You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	SA: ABS, ABS, ABS, ABS, ABS, ABS WCDMA: ABS, ABS, ABS, ABS, ABS, ABS I AND, AND, AND, AND, AND, AND C2K: REL, REL, REL, ABS, REL, REL I AND, AND, ABS, REL, REL, REL WiMAX OFDMA: REL, REL, REL, REL, REL, REL I REL, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute I Relative I Abs AND Rel I Abs OR Rel
Key Path	**Meas Setup, Offset/Limits, Limits**

Method

Sets the measurement method

Integ BW-enables you to set the channel integration bandwidth.

RRC Weight-selects Root Raised Cosine (RRC) filtering of the carriers and all adjacent channels. The α value (rolloff) for the filter is set to the value of the Filter Alpha parameter. This parameter is only available when W-CDMA 3GPP has been selected as the Radio Std from the Mode Setup menu.

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:SEMask:FILTer[:RRC][:STATe] OFF|ON|0|1` `[:SENSe]:SEMask:FILTer[:RRC][:STATe]?`
Example	SEM:FILT ON SEM:FILT?

Dependencies/Couplings	Grayed unless W-CDMA is the active Radio Standard
Remote Command Notes	1|ON = RRC Weight, 0|OFF = IntegBW You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	RRCWeight|IntegBW
Key Path	**Meas Setup**

Filter Alpha

Sets the alpha value for the RRC Filter. This parameter is only available when W-CDMA 3GPP has been selected as the Radio Std from the Mode Setup menu.

Mode	SA, WCDMA, C2K
Remote Command	`[:SENSe]:SEMask:FILTer[:RRC]:ALPHa <real>` `[:SENSe]:SEMask:FILTer[:RRC]:ALPHa?`
Example	SEM:FILT:ALPH 0.3 SEM:FILT:ALPH?
Dependencies/Couplings	Grayed unless W-CDMA is the active Radio Standard. The Preset and *RST value given above will never actually be used until W-CDMA is selected, then appropriate value will be set. This is because after executing a Factory Preset or *RST the Radio Standard will be set to None which disables RRC Filtering.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode or cdma2000 mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	0.22
State Saved	Saved in instrument state.
Min	0.01
Max	1.0
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CONFigure:SEMask`
Example	CONF:SEM
Dependencies/Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Key Path	**Meas Setup**

Trigger

Accesses a menu that enables you to select and control the trigger source for the current measurement.

See Triggers in the "Measurement Functions" section for more information.

Key Path	**Front-panel key**

Trigger Source

Specifies a trigger source. Trigger settings are mode global.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:TRIGger:SEMask[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe` `:TRIGger:SEMask[:SEQuence]:SOURce?`
Example	TRIG:SEM:SOUR EXT TRIG:SEM:SOUR?
Restriction and Notes	ExtRear=1 ExtFront=2
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run (Immediate)|Line|External 1|External 2|Periodic Timer
Key Path	**Trigger**

Sweep/Control

Displays a menu that enables you to set up and control the sweep time, and source of the current measurement.

Key Path	**Front-panel key**

Pause/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 when paused. See the Mode functionality section for details.

Key Path	**Sweep/Control, Pause/Resume**

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement... If there are no active markers, **Marker** selects marker 1, sets it to Normal and places it at the center of the display. You can turn on and control up to 12 markers.

Key Path	**Front-panel key**

Marker Type

Sets the marker control mode to Normal and Off. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. The marker X axis value entered in the active function area will display the marker value to its full entered precision. If the current control mode for the measurement is Off, there is no active function and the active function is turned off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|OFF` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:SEM:MARK:MODE POS CALC:SEM: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.
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state.
Range	Normal|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**.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X <freq>` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X?`
Example	CALC:SEMask:MARK3:X 1.0 GHz CALC:SEMask: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**. The query is returned in the fundamental units for the current marker X Axis scale. If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on instrument condition, although the Preset/Default is defined as 1.5 GHz.
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return 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**, except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition <real>` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition?`

Example	CALC:SEM:MARK10:X:POS 1001 CALC:SEM: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**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is **Off** the response is not a number. When a Marker is turned on, it is placed center of the screen on the trace. Therefore the default value depends on he instrument condition although the Preset/Default is defined as 6507 (this value might be the expected value when all the offsets are on).
Preset	After a preset, all Markers are turned OFF, so Marker X Axis Value query will return 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 Y Axis unit.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :Y?`
Example	CALC:SEM:MARK11:Y 10 dBm CALC:SEM:MARK11:Y?
Restriction and Notes	Since result value is always calculated from acquisition data, the default value is arbitrary. Although the Preset/Default values is defined.
Preset	Result dependent on markers setup and signal source
State Saved	No

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).

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CALCulate:SEMask:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:SEMask:MARKer:COUPle[:STATe]?`
Example	CALC:SEM:MARK:COUP ON CALC:SEM:MARK:COUP?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker**

All Markers Off

Turns all active markers off in all views.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SEMask:MARKer:AOFF`
Example	CALC:SEM:MARK:AOFF
Key Path	**Marker**

Marker State

Sets or queries the state of a marker. Setting a marker that is OFF to an ON (1) state, puts it in Normal mode and places it at the center of the screen.

Mode	SA, WCDMA, C2K
Remote Command	`:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe OFF|ON|0|1` `:CALCulate:SEMask:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:STATe?`
Example	CALC:SEM:MARK3:STATE ON CALC:SEM:MARK3:STATE?
Preset	OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF|OFF
State Saved	Saved in instrument state.
Range	On | Off

Peak Search

There is no ‘Peak Search’ supported in Spectrum Emission Mask so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Marker To

There is no ‘Marker To’ functionality supported in Spectrum Emission Mask so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

There are no ‘Marker Functions’ supported in Spectrum Emission Mask so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

9 Spurious Emissions

The Spurious Emissions measurement identifies and determines the power level of spurious emissions in certain frequency bands.

Key Path	**Meas**

Remote Command Results

The following commands can be used to retrieve the measurement results:

`:CONFigure:SPURious`

`:INITiate:SPURious`

`:FETCh:SPURious[n]?`

`:READ:SPURious[n]?`

`:MEASure:SPURious[n]?`

Command	Return Value
FETCh:SPURious [n]? MEASure:SPURious [n]? READ:SPURious [n]? (Note – these commands are not available when viewing the Range Table)	n = 1 (or not supplied) Returns a variable-length (1+6*Spurs – up to 1201 entries) comma separated list containing detailed information in the following format: Number of spurs in following list (Integer) [Repeat the following for each spur] Spur # Range # Spur was located (Integer) Frequency of Spur (Hz, Float64) Amplitude of Spur (dBm, Float32) Absolute Limit (dBm, Float32) Pass or Fail (1|0, Boolean) n = 2 – 21 Returns a comma separated list of the trace data for the selected range (where range number = n – 1). If selected range is not active SCPI_NAN is returned for each trace data element where SCPI_NAN = 9.91E37. n = 22 Returns the number of spurs found.

n = 23 – 42

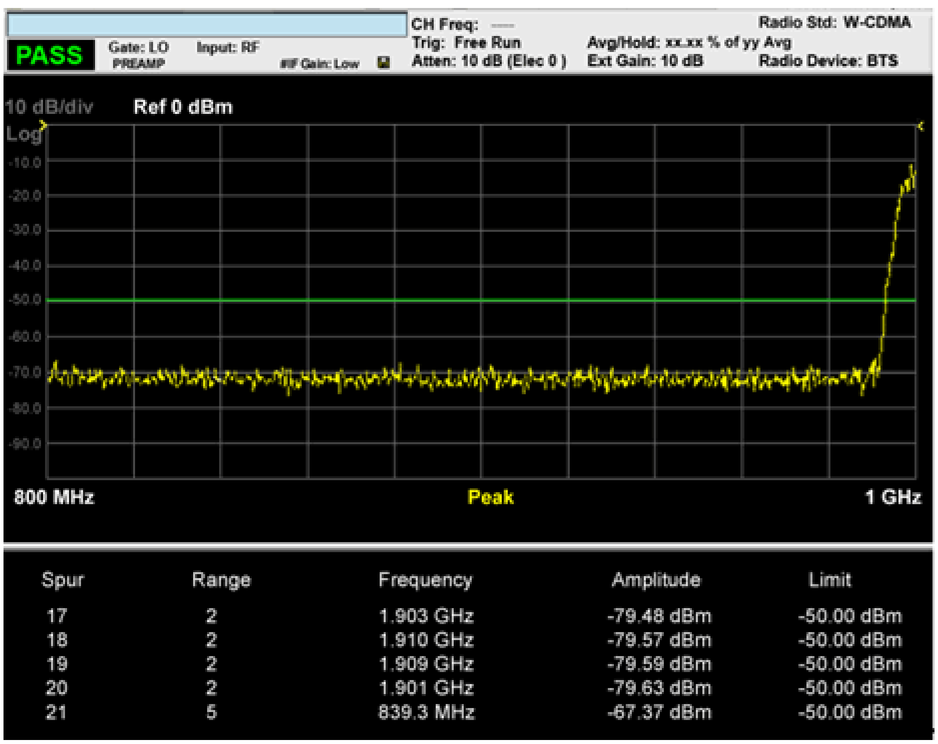
Returns a comma separated list of the trace data for the selected range (where range number = n – 22). If selected range is not active SCPI_NAN is returned for each trace data element where SCPI_NAN = 9.91E37.

Measurement Results

The graphic displays the results of the measurement with the parameters listed in the following table.

Result	Units	Min	Max
Spur	N/A	0	200
Range	N/A	1	20
Frequency	Hz	Analyzer Min	Analyzer Max
Amplitude	dBm	–150	50
Limit	dBm	–150	50

Measurement Result View



The spurs listed are within the current value of the Marker Peak Excursion setting of the absolute limit. All of the spurs listed passed. Any spur that fails the absolute limit will have an ‘F’ beside it.

Frequency/Channel

Frequency/Channel is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**

Span X Scale

Span X Scale is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**

AMPTD Y Scale

AMPTD Y Scale opens a menu of functions that enable you to modify the Amplitude parameters.

See AMPTD Y Scale in the "Analyzer Setup Functions: section for more information.

Key Path	**Front-panel key**

Ref Value

Sets the value for the absolute power reference. When Auto Scaling for the Y-axis is off, the measurement uses the current reference level settings. When Auto Scaling for the Y-axis is on, the analyzer will set the reference level such that the absolute limit will be positioned two divisions down from the top of the display.

Mode	SA, WCDMA, WiMAX OFDMA
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel < real>` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:SPUR:VIEW:WIND:TRAC:Y:RLEV –50 dBm DISP:SPUR:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When the Y Auto Scaling is off, the measurement uses the current reference level settings. When the Y Auto Scaling is on, the analyzer automatically sets the reference level such that the absolute limit is positioned two divisions down from the top of the display. This is the most useful setting when searching for spurs. The algorithm used for determining the ref level is Ref Level = Absolute Limit + (2 * Scale/Div). All other reference level settings are left as the current base instrument settings.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Min	–250.0 dBm
Max	250.0 dBm
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 units per division of the vertical scale in the logarithmic display. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:SPUR:VIEW:WIND:TRAC:Y:PDIV 10 dB DISP:SPUR:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When the Scale Coupling is On, this value is automatically determined by the measurement result. When you set a value manually, Scale Coupling automatically changes to Off.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Range	0.10 dB to 20.00 dB
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 "Measurement Setup Functions" section for more information.

Key Path	**AMPTD Y Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:SPURious:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:SPUR:VIEW:WIND:TRAC:Y:COUP OFF :DISP:SPUR: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. When the Y Auto Scaling is off, the measurement uses the current reference level settings. When the Y Auto Scaling is on, the analyzer automatically sets the reference level such that the absolute limit is positioned two divisions down from the top of the display. This is the most useful setting when searching for spurs. The algorithm used for determining the ref level is Ref Level = Absolute Limit + (2 * Scale/Div). All other reference level settings are left as the current base instrument settings.
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu that includes the Display key, which enables you to control the instrument display.

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 will remain 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	WCDMA, WiMAX OFDMA
Remote Command	`:DISPlay:SPURious:ANNotation:TITLe:DATA <string>`
	`:DISPlay:SPURious:ANNotation:TITLe:DATA?`
Example	DISP:SPUR:ANN:TITL:DATA “BASELINE TEST”
	DISP:SPUR:ANN:TITL:DATA?
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

Trace/Detector is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**

BW

BW is unavailable in the Spurious Emissions measurement.

Key Path	**Front-panel key**

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**

Avg/Hold Num

Specifies the number of measurement averages used to calculate the measurement result. The average is displayed at the end of each sweep.

Average State allows you to turn averaging On or Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	SPUR:AVER:COUN 2500 SPUR:AVER:COUN? SPUR:AVER ON SPUR:AVER?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0FF
State Saved	Saved in instrument state.
Min	1
Max	10000
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 will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Mode	SA, WCDMA, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:SPURious:AVERage:TCONtrol?`
Example	SPUR:AVER:TCON REP SPUR:AVER:TCON?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Range Table

The range table is used to enter the settings for up to twenty ranges.

Upon entering the range table (front panel only) the measurement is stopped and the analyzer is set to a constantly sweeping idle state. The analyzer will be set to the current values of range 1, regardless if it is on or off. If a range is outside the values in the current range table for that range, "---" will appear to indicate this range is currently inactive. To change a parameter, select the appropriate menu key and enter the value using the numeric keypad, or the knob. The analyzer settings will be updated with the new parameter values. Although no measurements are being made, this allows you to preview the range they will be measuring.

If the range is changed, the analyzer will change its settings to reflect the currently selected range. The selected range will be displayed on the last line of the range table view unless; the selected range is 5 or less in the normal range table view. In this case, the first 5 entries of the range table will be displayed and the zoom mode is selected. In the zoom mode all 20 ranges can be displayed.

Key Path	**Meas Setup**

Range Number

Selects the range using the front panel keys.

Key Path	**Meas Setup**

Range State

Changing the range will update the values on the other menu keys so that they reflect the settings for the selected range. If Range is turned on, it will be used as part of the measurement. If it is off, it will be excluded. A range is made up of the next eleven parameters. This parameter can send up to 20 values. The location in the list sent corresponds to the range the value is associated with. Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0` `[:SENSe]:SPURious[:RANGe][:LIST]:STATe?`
Example	SPUR:STAT ON SPUR:STAT?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, Range Table**

Start Freq

Sets the start frequency of the analyzer. This parameter can send up to 20 values. The location of where the start frequency occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STARt?`
Example	SPUR:FREQ:STAR 250 MHz, ... SPUR:FREQ:STAR?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.

Min	–80 MHz
Max	Hardware Dependent: Option 503: 3699999990 Option 508: 8499999990 Option 513: 13799999990 Option 526: 26999999990
Key Path	**Meas Setup, Range Table**

Stop Freq

Sets the stop frequency of the analyzer. This parameter can send up to 20 values. The location of where the stop frequency occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:FREQuency:STOP?`
Example	SPUR:FREQ:STOP 250 MHz, … SPUR:FREQ:STOP?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Min	–79999990
Max	Hardware Dependent: Option 503: 3.7 GHz Option 508: 8.5 GHz Option 513: 13.8 GHz Option 526: 27.0 GHz
Key Path	**Meas Setup, Range Table**

Res BW

Sets the resolution bandwidth of the analyzer. This parameter can send up to 20 values.

The location of where the resolution bandwidth occurs in the list sent to the measurement corresponds to the range the value is associated with.

Missing values are not permitted. In other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution] <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]?`
Example	SPUR:BWID 250 kHz, … SPUR:BWID? SPUR:BWID:AUTO ON, ON, ON, OFF, OFF, OFF, OFF, OFF, ON, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, ON, ON SPUR:BWID:AUTO?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SA:OFF,OFF,OFF,OFF,OFF,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON WCDMA:OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**Meas Setup, Range Table**
BAF SCPI Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:SPURious[:RANGe][:LIST]:BANDwidth[:RESolution]:AUTO?`

Video BW

Sets the Video BW mode of the analyzer. This can be Auto, where the analyzer determines the optimum setting or Manual, where you determine the setting. This parameter can send up to 20 values. The location in the list sent corresponds to the range the value is associated with. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must sent all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
Example	SPUR:BWID:VID 2 MHz, … SPUR:BWID:VID? SPUR:BAND:VID:AUTO ON, ON, OFF, OFF, OFF, ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, ON, ON, ON, ON, ON SPUR:BAND:VID:AUTO?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
Min	1 Hz
Max	50 MHz
Key Path	**Meas Setup, Range Table**
BAF SCPI Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:SPURious[:RANGe][:LIST]:BANDwidth:VIDeo:AUTO?`

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions. The **Filter Type** menu gives you control over these parameters.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop, GAUSsian|FLATtop` `[:SENSe]:SPURious[:RANGe][:LIST]:BANDwidth:SHAPe?`
Example	SPUR:BAND:SHAP GAUS, GAUS, GAUS, GAUS, GAUS, GAUS, FLAT, FLAT, FLAT, FLAT, FLAT, GAUS, GAUS, GAUS, GAUS, GAUS, FLAT, FLAT, GAUS, GAUS SPUR:BAND:SHAP?
Range	Gaussian (Normal)|Flattop
Key Path	**Meas Setup, Range Table**

Abs Start Limit

Determines the limit above which spurs will report a failing. If Abs Stop Limit Mode is set to Auto, this is coupled to Abs Stop Limit to make a flat limit line. If set to Man, Abs Start Limit and Abs Stop Limit can take different values to make a sloped limit line.

If the Limit Line Test parameter is off then any spurs which are found to be above the current 'Peak Excursion' will be added to the results table. From these spurs, the amplitude will be checked using the abs limit start and abs limit stop parameters and then calculate the limit. An 'F' will be appended to the amplitude value of the spur if the measured amplitude is above the limit. If the Limit Line Test is on, only the spurs whose amplitudes exceed the limit will be reported.

This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must sent all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt] <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA[:STARt]?`

Example	CALC:SPUR:LIM:ABS:DATA –25 dBm, … CALC:SPUR:LIM:ABS:DATA?
State Saved	Saved in instrument state.
Min	–150.0 dBm
Max	50.0 dBm
Key Path	**Meas Setup, Range Table**

Abs Stop Limit

Abs Stop Limit is used to determine the limit above which spurs will report a failing. If Abs Stop Limit Mode is set to Auto, this is coupled to Abs Start Limit to make a flat limit line. If set to Man, Abs Start Limit and Abs Stop Limit can take different values to make a sloped limit line.

This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must sent all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Abs Stop Limit Mode, when set to Couple, couples Abs Start Limit and Abs Stop Limit to make a flat limit line. If set to Man, Abs Start and Abs Stop can take different values to make a sloped limit line.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>, <ampl>` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP?`
Example	CALC:SPUR:LIM:ABS:DATA:STOP –25 dBm, … CALC:SPUR:LIM:ABS:DATA:STOP? CALC:SPUR:LIM:ABS:DATA:STOP:AUTO ON, ... CALC:SPUR:LIM:ABS:DATA:STOP:AUTO?
Preset	ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	–150.0 dBm
Max	50.0 dBm
Key Path	**Meas Setup, Range Table**

BAF SCPI Command	`:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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` `:CALCulate:SPURious[:RANGe][:LIST]:LIMit:ABSolute[:UPPer]:DATA:STOP:AUTO?`

Peak Excursn

Sets the minimum amplitude variation of signals that can be identified as peaks. If a value of 6 dB is selected, peaks that rise and fall more than 6 dB above the peak threshold value are identified. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion <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>, <rel_ampl>, <rel_ampl>, <rel_ampl>` `[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:EXCursion?`
Example	SPUR:PEAK:EXC 20 dB, ... SPUR:PEAK:EXC?
State Saved	Saved in instrument state.
Min	0.0 dB
Max	100.0 dB
Key Path	**Meas Setup, Range Table**

Pk Threshold

Sets the minimum amplitude of signals that can be identified as peaks. For example, if a value of –90 dBm is selected, only peaks that rise and fall more than the peak excursion value which are above –90 dBm are identified. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>` `[:SENSe]:SPURious[:RANGe][:LIST]:PEAK:THReshold?`
Example	SPUR:PEAK:THR –50 dBm, ... SPUR:PEAK:THR?
State Saved	Saved in instrument state.
Min	–100
Max	0
Key Path	**Meas Setup, Range Table**

Detector 1

Sets the detector to be used by the trace for spur detection and limit line testing.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion] AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, AVERage|NEGative|NORMal|POSitive|SAMPle|RMS` `[:SENSe]:SPURious[:RANGe][:LIST]:DETector[1][:FUNCtion]?`
Example	SPUR:DET NORM, ... SPUR:DET?

Restriction and Notes	For backward compatibility, "NORMal" is available as a SCPI command parameter. However this is treated the same as "RMS" internally, so the query never returns "NORMal" as its results.
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak
Key Path	**Meas Setup, Range Table**

Detector 2

Sets the detector to be used by the trace for display purposes only.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion] OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS, OFF|AVERage|NEGative|NORMal|POSitive|SAMPle|RMS` `[:SENSe]:SPURious[:RANGe][:LIST]:DETector2[:FUNCtion]?`
Example	SPUR:DET2 AVER, ... SPUR:DET2?
Restriction and Notes	For backward compatibility, "NORMal" is available as a SCPI command parameter. However this is treated same as "RMS" internally, so the query never returns "NORMal" as its results.
State Saved	Saved in instrument state.
Range	Off | Normal | Average | Peak | Sample | Negative Peak
Key Path	**Meas Setup, Range Table**

Sweep Time

Sets the sweep time mode of the analyzer. This can be Auto, where the analyzer determines the optimum setting or Manual, where you determine the setting. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted. If you want to change values 2 and 6 you must sent all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>, <seconds>`
	
	`[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME?`

Example	SPUR:SWE:TIME 10 ms, ... SPUR:SWE:TIME? SPUR:SWE:TIME:AUTO ON, ... SPUR:SWE:TIME:AUTO?
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	1.0E–3
Max	2.0E+3
Key Path	**Meas Setup, Range Table**
BAF SCPI Command	`[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO?`

Points

Sets the number of points per sweep for the measurement. This parameter can send up to 20 values. The location in the list sent corresponds to the range of the associated value. Missing values are not permitted, in other words, if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain as they were. The query for this parameter always returns 20 values.

The Points mode can be manual, where you determine the setting or auto, where the analyzer determines the number of trace points to ensure the sweep points resolution equals RBW/2. This is calculated using the following algorithm:

Points = (Stop Freq – Start Freq) / (ResBW / 2), with the computed values being clipped to a minimum of 101 and a maximum of 8192.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts` `[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts?`
Example	SPUR:SWE:POIN 1001 SPUR:SWE:POIN? SPUR:SWE:POIN:AUTO ON, ... SPUR:SWE:POIN:AUTO?
Preset	OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF,OFF
State Saved	Saved in instrument state.
Min	101
Max	20001
Key Path	**Meas Setup, Range Table**
BAF SCPI Command	`[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, 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]:SPURious[:RANGe][:LIST]:SWEep:POINts:AUTO?`

IF Gain

Sets the IF Gain function to Auto, On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads. A switched IF amplifier with approximately 10 dB of gain is available. This amplifier takes full advantage of the RF dynamic range of the analyzer. When it can be turned on without an overload, the dynamic range is always better with the amplifier on than off.

Key Path	**Meas Setup**

IF Gain Auto

Activates the rules for auto IF Gain.

Remote Command	[:SENSe]:SPURious:IF:GAIN:AUTO[: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SPURious:IF:GAIN:AUTO[:STATe]?
Example	SPUR:IF:GAIN:AUTO ON, … SPUR:IF:GAIN:AUTO?
Dependencies/Couplings	When the sweep type is Swept, Auto sets IF Gain to High Gain 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 using the swept sweep type, auto sets IF Gain to Low Gain.
State Saved	Saved in instrument state.
Range	Auto|Man

IF Gain State

Selects the range of IF Gain.

Remote Command	[:SENSe]:SPURious:IF:GAIN[: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, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1 [:SENSe]:SPURious:IF:GAIN[:STATe]?
Example	SPUR:IF:GAIN ON, … SPUR:IF:GAIN?
State Saved	Saved in instrument state.

Meas Type

Selects either Examine or Full measurement type. This parameter is coupled to the average mode. Therefore, if the examine measurement type is selected, the measurement sets the average mode to exponential. If the full measurement type is selected, the measurement sets average mode to repeat. The behavior of each measurement type is described in the table below. When averaging is on, trace averaging is used as each active range is measured. Averaging is not used at any other time.

Single	Continuous

	No Spurs Found	Spurs Found	No Spurs Found	Spurs Found
Examine	All active ranges are measured. On completion the measurement is set to the idle state and the 'No Spurs' happening is displayed.	All active ranges are measured and the spurs found reported. On completion the measurement is set to the idle state and the trace containing the worst spur restored. The spur menu key is enabled. A marker is also added which is set to the frequency of the worst spur.	All active ranges are measured. On completion the measurement is set to the idle state and the 'No Spurs' happening is displayed.	All active ranges are measured and the spurs found reported. On completion the SA is set to the range containing the worst spur found and continually sweeps this range. The spur menu key is enabled. A marker is also added which is set to the frequency of the worst spur.
Full	All active ranges are measured. On completion measurement is set to idle state and the 'No Spurs' happening is displayed.	All active ranges are measured and spurs found reported. On completion the measurement is set to the idle state, displaying the trace of the last active range.	Measurement continually cycles through all active ranges.	All active ranges are measured and spurs found reported. On each cycle of the active ranges the spurs found are reset. This ensures any remote queries retrieve the trace data that matches the currently displayed results.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious:TYPE EXAMine|FULL` `[:SENSe]:SPURious:TYPE?`
Example	SPUR:TYPE FULL SPUR:TYPE?
State Saved	Saved in instrument state.
Range	Examine | Full
Key Path	**MeasSetup**

Spur

Displays any spurs found. It is only enabled when the measurement type is set to examine and will turn on upon completion of a measurement. Once the Spur menu key has been enabled, you can view any spur. The measurement sets the analyzer to the range in which the currently selected spur was found. The range settings only changes if the spur selected is in a range which is different from the current range settings. A marker is used to identify the currently selected spur on the trace.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious:SPUR <integer>`
	`[:SENSe]:SPURious:SPUR?`
Example	SPUR:SPUR 55
	SPUR:SPUR?
State Saved	No
Min	1
Max	200
Key Path	**Meas Setup**

Spurious Report Mode

Sets the spurious report mode to either Limit Line Test Only or All.

Select the Limit Line Test (LIMTest) option to report only spurs above the limit line. Any spurs reported will cause the measurement to fail. See Abs Start Limit for more information.

Select All (ALL) to report all spurs detected by Peak Threshold and Peak Excursion.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious:REPT:MODE ALL|LIMTest`
	`[:SENSe]:SPURious:REPT:MODE?`
Example	SPUR:REPT:MODE LIMT
	SPUR:REPT:MODE?
Range	All | Limit Test
Key Path	**Meas Setup**

Meas Preset

Restores all measurement parameters to their default values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CONFigure:SPURious`
Example	CONF:SPUR
Key Path	**Meas Setup**

Trigger

Accesses the Trigger menu which contains keys to control the 1-of-N selection of the Trigger source.

The trigger functions let you select the trigger settings for a sweep or measurement.

See Trigger in the "Measurement Functions" section for more information.

Key Path	**Front-panel key**

Trigger 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.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:TRIGger:SPURious[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:SPURious[:SEQuence]:SOURce?`
Example	TRIG:SPUR:SOUR FRAM TRIG:SPUR:SOUR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Range	Free Run (Immediate) | Video (IF Envlp) | Line | External 1 | External 2 | RF Burst (Wideband) | Periodic Timer
Key Path	**Trigger**

Sweep/Control

Accesses the Sweep/Control menu keys used to set up and control the sweep time and source.

Key Path	**Front-panel key**

Sweep Time

Setting of the Sweep Time is specified Range-by-Range under the Range Table. Therefore, measurement specific Sweep Time capability is not supported in the Spurious Emission measurement.

Sweep Setup

Sets the sweep functions that control the sweep state and time.

Key Path	**Sweep/Control**

Auto Sweep Time

Switches the analyzer between normal and accuracy sweep states. Setting **Auto Sweep Time** to **Accy** will result in slower sweep times, usually about three times as long, but better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when **Auto Sweep Time** is set to **Accy**.

Additional amplitude errors which occur when **Auto Sweep Time** is set to **Norm** are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, **Norm** is the preferred setting of **Auto Sweep Time**. **Auto Sweep Time** is set to **Norm** on a **Preset** or **Auto Couple**. This means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:SPURious:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:SPURious:SWEep:TIME:AUTO:RULes?`
Example	SPUR:SWE:TIME:AUTO:RUL ACC SPUR:SWE:TIME:AUTO:RUL?

Restriction and Notes	In Zero Span, this key is irrelevant and inaccessible (because the whole Sweep Setup menu is grayed out in Zero Span), however Sweep Setup settings can be changed remotely with no error indication. This command is implemented as “[:SENSe]:SPURious[:RANGe][:LIST]:SWEep:TIME:AUTO:RULes” to avoid illegal SCPI node definition. So, this command should be used as “[:SENSe]:SPURious:SWEep:TIME:AUTO:RULes”.
State Saved	Saved in instrument state.
Range	Norm | Accy
Key Path	**Sweep/Control, Sweep Setup**

Points

Setting of Points is specified Range-by-Range under the Range Table. Therefore, the measurement specific Points capability is not supported in the Spurious Emission measurement.

Pause/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 Pause/Resume in the "Measurement Setup Functions" section for more information.

Key Path	**Sweep/Control**

Marker

Displays the menu keys that enable you to select, set up and control the markers for the current measurement.

Key Path	**Front-panel key**

Marker Type

Sets the marker control mode to **Normal**, **Delta** and **Off**. Normal enables you to activate the selected marker to read the power level and time. Delta enables you to read the differences in the power levels and time scales between the selected marker and the next marker. Off enables you to turn off the selected marker.

All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE POSition|DELTa|OFF`
	
	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MODE?`

Example	CALC:SPUR:MARK:MODE POS CALC:SPUR: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.
Dependencies/Couplings	No
Remote Command Notes	You must be in cdma2000 mode, W-CDMA mode, GSM/EDGE mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode. NORMal is changed to POSition in the new SA.
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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:SPUR:MARK2:X 25 kHz CALC:SPUR: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 absolute X Axis marker value if the control mode is Normal, or the offset from the 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.
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:SPUR:MARK10:X:POS?

Restriction and Notes	The query returns the absolute X Axis marker value in trace points if the control mode is **Normal**, or the offset from the 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.
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker Y Axis Value (Remote Command only)

Returns the Marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:SPUR:MARK11:Y?
Restriction and Notes	If no suffix is sent it will use the current Y Axis unit. If a suffix is sent that does not have units of absolute amplitude, an error “Invalid suffix” will be generated.
State Saved	No

Properties

Accesses the Properties menu to set certain properties of the selected marker.

Key Path	**Marker**

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Every marker has another marker to which it is relative. This marker is referred to as the "reference marker" for that marker. This attribute is set by the **Marker**, **Properties**, **Relative To** key. The marker must be a **Delta** marker to make this attribute relevant. If it is a **Delta** marker, the reference marker determines how the marker is controlled and how its value is displayed. A marker cannot be relative to itself.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:SPUR:MARK3:REF 5 CALC:SPUR: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 will be returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the Spectrum Analysis mode, GSM mode or WiMAX mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	Saved in instrument state.
Min	1
Max	12
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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:SPURious:MARKer:COUPle[:STATe]?`
Example	CALC:SPUR:MARK:COUP ON CALC:SPUR:MARK:COUP?
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker**

All Markers Off

Turns off all markers.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer:AOFF`
Example	CALC:SPUR:MARK:AOFF
Key Path	**Marker**

Peak Search

Performs a peak search and opens the Peak Search menu. The Peak Search functions allow you to define specific search criteria to determine which signals can be considered peaks, excluding unwanted signals from the search.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:SPUR:MARK2:MAX`
Key Path	**Peak Search**

Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the current marker value.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:SPUR:MARK2:MAX:NEXT
Key Path	**Peak Search**

Next Pk Right

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	CALC:SPUR:MARK2:MAX:RIGH
Key Path	**Peak Search**

Next Pk Left

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	CALC:SPUR:MARK2:MAX:LEFT
Key Path	**Peak Search**

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. This sets the control mode for the selected marker to Delta mode. See the Marker section for the complete description of this function. The key is duplicated here in the Peak Search Menu to allow you to conveniently perform a peak search and change the control of the Marker mode to Delta without having to access two separate menus.

Key Path	**Peak Search**

Continuous Peak Search

Turns Continuous Peak Search On or Off. When Continuous Peak Search is on, a peak search is automatically performed for the selected marker after each sweep. The rules for finding the peak are exactly the same as for **Peak Search** including the peak criteria rules. If no valid peak is found, the “No Peak Found” warning is generated after each sweep. If a valid peak is found, the message “Peak Found” is displayed after each sweep.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe] ON|OFF|1|0` `:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe]?`
Example	CALC:SPUR:MARK:CPE ON
State Saved	Saved in instrument state.
Range	Off|On
Key Path	**Peak Search**

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	CALC:SPUR:MARK:PTP
Restriction and Notes	Turns on the Marker Δ active function.
Dependencies/Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Key Path	**Peak Search**

Min Search

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:SPURious:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:SPUR:MARK:MIN
Key Path	**Peak Search**

Marker To

There is no ‘Marker To’ functionality supported in Spurious Emissions so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

Marker Function

There are no ‘Marker Functions’ supported in Spurious Emissions so this front-panel key will display a blank menu key when pressed.

Key Path	**Front-panel key**

10 Occupied Bandwidth

The Occupied Bandwidth measurement computes and displays the bandwidth occupied by a given percentage of the total mean power of a signal.

Key Path	**Meas**

Remote Command Results

Command	Return Value
`:CONFigure:OBWidth` `:INITiate:OBWidth`	N/A

`:FETCh:OBWidth[n]?`
`:MEASure:OBWidth[n]?`
`:READ:OBWidth[n]?`
	Refer to the table below.

`:FETCh:OBWidth:OBWidth?`
`:MEASure:OBWidth:OBWidth?`
`:READ:OBWidth:OBWidth?`
	Occupied BW in Hz
	(BW compatibility functionality)

`:FETCh:OBWidth:FERRor?`
`:MEASure:OBWidth:FERRor?`
`:READ:OBWidth:FERRor?`
	Transmit Freq Error in Hz
	(BW compatibility functionality)

`:FETCh:OBWidth:XDB?`
`:MEASure:OBWidth:XDB?`
`:READ:OBWidth:XDB?`
	x dB Bandwidth in Hz
	(BW compatibility functionality)

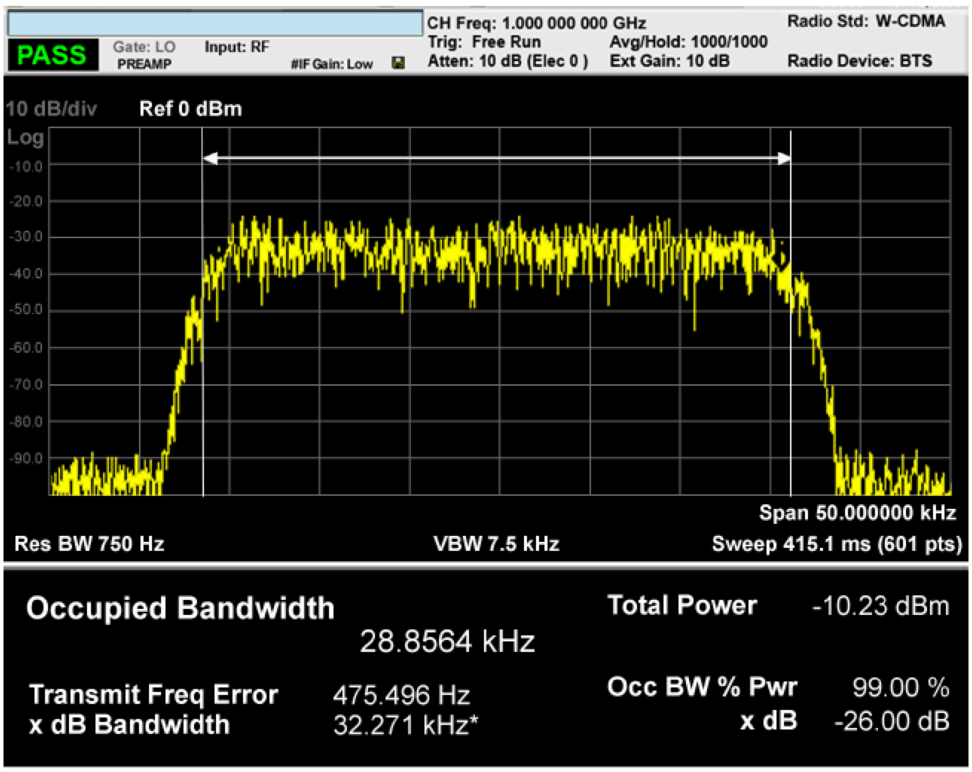
n	**Results Returned**
n=1 (or not specified)	Returns 6 scalar results, in the following order: 1. Occupied bandwidth – Hz 2. Total Power - dBm 3. Span - Hz 4. Spectrum Trace Points - points 5. Res BW – Hz 6. Transmit Frequency Error Hz 7. x DB Bandwidth - Hz
2	Returns the frequency-domain spectrum trace (data array) for the entire frequency range being measured.

Measurement Results

There is a single results view available for this measurement.

Spectrum View

The asterisk next to the x dB bandwidth value indicates the results may not have been determined with optimal analyzer settings. If this result (emission bandwidth) is your primary interest, select Meas Setup, Max Hold, On. Then change the detector mode to peak. Acquiring peak data ensures accuracy of the result.



Occupied Bandwidth

The occupied bandwidth calculates the total power of the analyzer span using an integration bandwidth (IBW) method.

Total Power

The total power is the power integrated in the specified span setting.

Transmit Freq Error

The transmit frequency error result is calculated as the difference between (f2+f1)/2 and the tuned center frequency of the signal. This calculation uses a linear interpolation to find the lower and upper carrier boundary point within the width of a sweep point, f1 and f2.

x dB Bandwidth

The x dB result is a bandwidth measured between two points on the signal which are a certain number of dBs down from the highest signal point within the OBW Span. For example, If the ‘x dB’ parameter is set to –26dB, and the ‘Occupied BW Span’ is set to 10 MHz, then the maximum signal power level is first determined from the 10MHz wide trace sweep. Next, the two furthest frequencies below (xdb_f1) and above (xdb_f2) the frequency of the maximum level occurrence are found where the signal level is 26dB below the peak level. This calculation also uses linear interpolation to find the lower and upper carrier boundary point within the width of a sweep point (the span divided by the number of sweep points).

The x dB bandwidth is calculated to be xdb_f2 – xdb_f1.

Span X Scale

Activates the Span function and displays the menu of span functions. The parameter values are measurement independent.

Key Path	**Front-panel key**

Span

Set the frequency of the occupied bandwidth span for the current measurement.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN <freq>` `[:SENSe]:OBWidth:FREQuency:SPAN?`
Example	:OBW:FREQ:SPAN 2.4 MHz :OBW:FREQ:SPAN?
Dependencies/Couplings	When changing the Occupied Bandwidth Span, the Resolution Bandwidth and Video Bandwidth are set to AUTO to prevent the span from clipping.
Preset	SA: 3 MHz WCDMA: 10 MHz WiMAX OFDMA: 20MHz
State Saved	Saved in instrument state.
Min	100 Hz
Max	100 MHz
Key Path	**Span X Scale**

Full Span

Changes the Occupied Bandwidth Span to show the full frequency range of the analyzer. When using external mixing, it changes the displayed frequency span to the frequency range specified for the selected external mixing band.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN:FULL`
Example	:OBW:FREQ:SPAN:FULL
Dependencies/Couplings	Selecting full span will change the measurement span value.

Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
	Span X Scale

Last Span

Changes the measurement frequency span to previous measurement span setting. If there is no existing previous span value then the span will remain unchanged.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:FREQuency:SPAN:PREVious`
Example	:OBW:FREQ:SPAN:PREV
Dependencies/Couplings	Selecting last span will change the measurement span value.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Key Path	**Span X Scale**

AMPTD Y Scale

Activates the Reference Value function and displays the Amplitude menu keys. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis

See AMPTD Y Scale in the "Analyzer Setup Functions" section for more information.

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:OBW:VIEW:WIND:TRAC:Y:RLEV 125 dBm :DISP:OBW:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you sets a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
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. This key has read-back text that describes the 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 logarithmic units per vertical graticule division on the display. When the Auto Scaling is On, the Scale/Div is automatically determined by the measurement result. When you set a value manually, Auto Scaling is automatically toggled to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:OBW:VIEW:WIND:TRAC:Y:PDIV 5 dB :DISP:OBW:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result. When you sets a value manually, Auto Scaling automatically changes to Off.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:OBW:VIEW:WIND:TRAC:Y:RPOS BOTT :DISP:OBW:VIEW:WIND:TRAC:Y:RPOS?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD/Y Scale**

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:OBWidth:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:OBW:VIEW:WIND:TRAC:Y:COUP ON :DISP:OBW:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically sets the scale per division to 10 dB and determines reference values based on the measurement results. When you sets a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off.
Preset	1
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu that enables 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

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 will remain 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.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:CHPower:ANNotation:TITLe:DATA "TITLE"`
	`:DISPlay:CHPower:ANNotation:TITLe:DATA?`
Example	DISP:OBW:ANN:TITL:DATA “Channel Power”
	DISP:OBW:ANN:TITL:DATA?
Preset	Occupied BW
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

Accesses a menu of functions that enables you to control the detectors for the current measurement. The following choices are available:

Auto- the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- **Sample**-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- **Normal**-the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- **Average**-the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- **Peak (Positive)**-the detector determines the maximum of the signal within the sweep points.
- **Negative Peak**-the detector determines the minimum of the signal within the sweep points.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:DETector[:FUNCtion] NORMal|AVERage|POSitive|SAMPle|NEGative` `[:SENSe]:OBWidth:DETector[:FUNCtion]?`
Example	:OBW:DET NORM :OBW:DET?

Restriction and Notes	When you manually select a detector (instead of selecting Auto), that detector is used regardless of other analyzer settings. The detector choices are: The Sample detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point. The Normal detector determines the peak of CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rose-n-fell detection. The Average detector determines the average of the signal within the sweep points. The averaging method is Power Average (RMS). The Peak detector determines the maximum of the signal within the sweep points. The Negative Peak detector determines the minimum of the signal within the sweep points.
Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Normal | Average | Peak | Sample | Negative Peak
Key Path	**Front-panel key**

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:DETector:AUTO ON|OFF|1|0` `[:SENSe]:OBWidth:DETector:AUTO?`
Example	:OBW:DET:AUTO ON :OBW:DET:AUTO?
Dependencies/Couplings	When the Detector choice is Auto, the detector selected becomes Average, which is the default setting of this measurement.
Preset	OFF

State Saved	Saved in instrument state.
Key Path	**Trace/Detector, Detector**

BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement.

Key Path	**Front-panel key**

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	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	:OBW:BAND 250 kHz :OBW:BAND? :OBW:BAND:AUTO OFF :OBW:BAND:AUTO?
Dependencies/Couplings	Sweep time is coupled to RBW. As the RBW changes, the sweep time (if set to Auto) is changed to maintain amplitude calibration. Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio of VBW/RBW (10:1). When Res BW is set to Auto, the resolution bandwidth is auto-coupled to span. The ratio of Span/RBW is approximately 106:1 when auto coupled. When Res BW is set to Man, bandwidths are entered manually, and these bandwidths are used regardless of other analyzer settings.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.

Preset	SA: Auto WCDMA: 30 kHz C2K: 12 kHz WiMAX OFDMA: 180KH SA:ON WCDMA, C2K, WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Min	1 Hz
Max	8 MHz
Key Path	**BW**

Video BW

Changes the analyzer post–detection filter.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	:OBW:BAND:VID 5 MHz :OBW:BAND:VID? :OBW:BAND:VID:AUTO ON :OBW:BAND:VID:AUTO?

Dependencies/Couplings	Video bandwidth (VBW) is coupled to RBW. As the resolution bandwidth changes, the video bandwidth (if set to Auto) changes to maintain the ratio set by VBW/RBW. Sweep Time is coupled to Video Bandwidth (VBW). As the VBW is changed, the sweep time (when set to Auto) is changed to maintain amplitude calibration. This occurs because of common hardware between the two circuits, even though the Video BW filter is not actually “in-circuit” when the detector is set to Average. Because the purpose of the average detector and the VBW filter are the same, either can be used to reduce the variance of the result. Although the VBW filter is not “in-circuit” when using the average detector, the Video BW key can have an effect on (Auto) sweep time, and is not disabled. In this case, reducing the VBW setting increases the sweep time, which increases the averaging time, producing a lower-variance trace. When using the average detector with either Sweep Time set to Man, or in zero span, the VBW setting has no effect and is disabled (grayed out). When the video bandwidth is AUTO coupled, the video bandwidth value is set to: Resolution Bandwidth * Video Bandwidth to Resolution Bandwidth Ratio
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	SA: Auto WCDMA: 300 kHz C2K:120 kHz WiMAX OFDMA:1.8MHz, ON
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Key Path	**BW**

Filter Type

Allows you to select the type of filter that will be used for the current measurement. Besides the Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

Remote Command	`[:SENSe]:OBWidth:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:OBWidth:BANDwidth:SHAPe?`
Example	OBW:BAND:SHAP GAUS OBW:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian | Flattop
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.

Initiates an averaging routine that averages the sweep points in a number of successive sweeps, resulting in trace smoothing.

Mode	SA, WCDMA, C2K, WiMAX OFDMA

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

Example	:OBW:AVER:COUN 1500 :OBW:AVER:COUN? :OBW:AVER ON :OBW:AVER?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	10, ON
State Saved	Saved in instrument state.
Min	1
Max	10000
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 will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:OBWidth:AVERage:TCONtrol?`
Example	:OBW:AVER:TCON REP :OBW:AVER:TCON?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	EXP
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Max Hold

When On, Max Hold displays and holds the maximum responses of the current measurement. Turn Max Hold to Off to disable the maximum hold feature.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:MAXHold ON|OFF|1|0` `[:SENSe]:OBWidth:MAXHold?`
Example	:OBW:MAX ON :OBW:MAX?
Dependencies/Couplings	Max Hold is coupled to Average/Hold state. The Max Hold function is activated only if Average state is On. If Max Hold is changed to On when Average state is Off, Average state is automatically set to On.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup**

Occ BW % Pwr

Assigns the percentage of the total power that will be measured within the Occupied Bandwidth for the current measurement. The resulting Occupied Bandwidth limits are displayed by markers placed on the frequencies of the specified percentage.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:PERCent <real>` `[:SENSe]:OBWidth:PERCent?`
Example	:OBW:PERC 75 :OBW:PERC?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	99.00
State Saved	Saved in instrument state.
Min	10
Max	99.99
Key Path	**Meas Setup**

x dB

Sets the x dB value used for the "x dB bandwidth" result that measures the bandwidth between two points on the signal which is x dB down from the highest signal point within the OBW Span.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:XDB <rel_ampl>` `[:SENSe]:OBWidth:XDB?`
Example	:OBW:XDB –20 dB :OBW:XDB?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	–26.0 dB
State Saved	Saved in instrument state.
Min	–100.0 dB
Max	–0.1 dB

Key Path	**Meas Setup**

IF Gain

The **IF Gain** key can be used to set the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, IF Gain**

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:OBWidth:IF:GAIN:AUTO[:STATe]?`
Example	:OBW:IF:GAIN:AUTO OFF :OBW:IF:GAIN:AUTO?
Dependencies/Couplings	When the auto attenuation exists (for example, with electrical attenuator), Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other settings, auto sets IF Gain to Low Gain.
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On
Key Path	**Meas Setup, IF Gain**

IF Gain State

Selects the range of the IF Gain.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:OBWidth:IF:GAIN[:STATe]?`

Example	:OBW:IF:GAIN ON
	:OBW:IF:GAIN?
Dependencies/Couplings	When the auto attenuation exists (for example, with electrical attenuator), the IF Gain setting is changed as following rule. Auto sets IF Gain to High Gain under any of the following conditions: the input attenuator is set to 0 dB, or the preamp is turned on and the frequency range is under 3.6 GHz. For other settings, auto sets IF Gain to Low Gain.
Remote Command Notes	Where ON = high gain
	OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain | High Gain
Key Path	**Meas Setup, IF Gain**

Limit

Enables you to turn on or off limit checking at the specified frequency. For results that fail the limit test, a red FAIL appears in the measure bar.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:LIMit:FBLimit <freq>`
	`:CALCulate:OBWidth:LIMit:FBLimit?`
	`:CALCulate:OBWidth:LIMit[:TEST] ON|OFF|1|0`
	`:CALCulate:OBWidth:LIMit[:TEST]?`
Example	:CALC:OBW:LIM:FBL 50 kHz
	:CALC:OBW:LIM:FBL?
	:CALC:OBW:LIM OFF
	:CALC:OBW:LIM?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	SA, WCDMA: 5 MHz
	C2K: 1.48 MHz
	WiMAX OFDMA: 10 MHz
State Saved	Saved in instrument state.
Min	10 kHz
Max	10 MHz

Key Path	**Meas Setup**

Meas Preset

Restores all measurement parameters to their default values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CONFigure:OBWidth`
Example	:CONF:OBW
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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:TRIGger:OBWidth[:SEQuence]:SOURce IMMediate|VIDeo|LINE|EXTernal[1]|EXTernal2|RFBurst|FRAMe|IF` `:TRIGger:OBWidth[:SEQuence]:SOURce?`
Example	:TRIG:OBW:SOUR EXT2 :TRIG:OBW:SOUR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run | Video | Line | External1 | External2 | RF Burst | Periodic Timer
Key Path	**Front-panel key**

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.

See Auto Trig under Trigger in the "Measurement Functions" section for more information.

Key Path	**Trigger, Auto Trig**

Trig Hold Off

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.

See Trig Hold Off under Trigger in the "Measurement Functions" section for more information.

Key Path	**Trigger, Trig Hold Off**

Sweep/Control

Displays a menu of functions that enable you to set up and control the sweep time and source 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. Note that additional overhead time, which impacts the sweep rate, is not calculated as part of the sweep time. In fact:

sweep rate = span/sweep time

update rate = 1/(sweep time + overhead)

sweep cycle time = sweep time + overhead

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:SWEep:TIME <time>`
	`[:SENSe]:OBWidth:SWEep:TIME?`
	`[:SENSe]:OBWidth:SWEep:TIME:AUTO OFF|ON|0|1`
	`[:SENSe]:OBWidth:SWEep:TIME:AUTO?`
Example	:OBW:SWE:TIME 50 ms
	:OBW:SWE:TIME?
	:OBW:SWE:TIME:AUTO ON
	:OBW:SWE:TIME:AUTO?
Preset	SA: Automatically Calculated
	WCDMA: 32.6 ms
	WiMAX OFDMA: 2.0 ms, SA: ON
	WCDMA, WiMAX OFDMA: OFF
State Saved	Saved in instrument state.
Min	1 ms
Max	4000 s
Key Path	**Sweep/control**

Sweep Setup

Accesses the sweep setup settings for the current measurement.

Key Path	**Sweep/Control**

Auto Sweep Time Rules

Switches the analyzer between normal and accuracy sweep states.

Setting Auto Sweep Time to Accy will result in slower sweep times, usually about three times as long, but better amplitude accuracy for CW signals. The instrument amplitude accuracy specifications only apply when Auto Sweep Time is set to Accy.

Additional amplitude errors which occur when Auto Sweep Time is set to Norm are usually well under 0.1 dB, though this is not guaranteed. Because of the faster sweep times and still low errors, Norm is the preferred setting of Auto Sweep Time. Auto Sweep Time is set to Norm on a Preset or Auto Couple. Note that this means that in the Preset or Auto Coupled state, instrument amplitude accuracy specifications do not apply.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes NORMal|ACCuracy` `[:SENSe]:OBWidth:SWEep:TIME:AUTO:RULes?`
Example	:OBW:SWE:TIME:AUTO:RUL NORM :OBW:SWE:TIME:AUTO:RUL?
Restriction and Notes	Set to Norm when Auto Couple is pressed or sent remotely.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm | Accy
Key Path	**Sweep/control, Sweep Setup**

Pause/Resume

Pauses the measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing the Resume resumes 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, Pause/Resume**

Points

Sets the number of points per sweep. The resolution of setting the sweep time will depend on the number of points selected. The current value of points is displayed parenthetically, next to the sweep time in the lower-right corner of the display.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:OBWidth:SWEep:POINts <integer>` `[:SENSe]:OBWidth:SWEep:POINts?`
Example	:OBW:SWE:POINt 1500 :OBW:SWE:POINt?
Restriction and Notes	This function is not available when signal identification is set to On (external mixing). Will be affected by: log sweep, segmented sweep Grayed out in measurements that do not support swept Blanked in modes that don't support swept. Whenever the number of sweep points change: - All trace data is erased - Any traces with Update Off will also go to Display Off (like going from View to Blank in the older analyzers) - Sweep time is re-quantized - Any limit lines that are on will be updated - If averaging/hold is on, averaging/hold starts over
Dependencies/Couplings	Whenever the number of sweep points change, the sweep time is re-quantized.
Preset	1001
State Saved	Saved in instrument state.
Min	101
Max	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**

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:OBW:MARK:MODE FIX
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	NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal ǀ Delta ǀ 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.**

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:OBW:MARK3:X?
Restriction and Notes	The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Freq**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

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**.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:OBW: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**.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
MIN/MAX/DEF Support	Yes

Marker Y Axis Value (Remote Command only)

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

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:OBW:MARK11:Y?
Preset	Result dependent on Markers setup and signal source.
State Saved	No

Properties

Accesses the marker properties menu.

Key Path	**Marker**

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:OBW: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 will be returned (the specified marker numbers relative marker). You must be in the Spectrum Analysis mode, WCDMA mode or WiMAX OFDMA mode to use this command. Use:INSTrument:SELect to set the mode.
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Marker, Properties**

All Markers Off

Turns off all markers.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer:AOFF`
Example	CALC:OBW:MARK:AOFF
Key Path	**Marker**

Marker To

There is no ‘Marker To’ functionality supported in Occupied Bandwidth so this front panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**

Marker Function

There are no 'Marker Functions' supported in Occupied Bandwidth so this front panel key will display a blank key menu when pressed.

Key Path	**Front-panel key**

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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:OBWidth:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:OBW:MARK2:MAX
Key Path	**Front-panel key**

11 Power vs. Time

Invokes the Power vs. Time measurement.

Key Path: **Meas**

NOTE: See the SENSe:PVTime commands for more measurement related commands.

`:CONFigure:PVTime`

`: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 point values, in volts. The I values are listed first in each pair, using 0 through the even-indexed values. The Q values are odd-indexed values.
n=1 (or not specified)	Returns the following comma-separated scalar results: 1. Sample time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc.). 2. Power of single burst is the mean power (in dBm) of the power reference region in the most recently acquired data, or in the last data acquired at the end of a set of averages. 3. Power averaged is the power (in dBm) for N averages of the power reference region, if averaging is on. The power is averaged across the power reference region of the burst. If there are multiple bursts in the acquired trace, only the first burst that satisfies the burst detection setting is picked up for the averaging process. If averaging is off, the value of Power averaged is the same as the Power value. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.). 5. 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. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process. 6. 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. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process. 7. Index of the data point where T0 occurred. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process.

2	Measured Trace data This returns comma-separated floating point numbers representing the Measured Trace data (in dBm).
n=1 (or not specified) Continued	8. Burst length of the useful part of the burst is the length of the burst measured at –3dB below the mean power in the useful part of the burst. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process. 9. Maximum value is the maximum peak level of the most recently acquired trace data (in dBm). 10. Minimum value is the minimum peak level of the most recently acquired trace data (in dBm). 11. Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process. 12. IQ point delta is the number of data points in a 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) 13. 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, the returned data has no meaning. 14. Time Offset is a floating-point number of the time interval in second between the trigger point and T0. The definition of the T0 depends on “Time Reference” parameter setting. If there are multiple bursts in the acquired trace, only the first burst that satisfies burst detection setting is picked up for the calculation process.
3	Measured Max Hold Trace data This returns comma-separated floating point numbers representing the Measured Max Hold Trace data (in dBm).
4	Measured Min Hold Trace data This returns comma-separated floating point numbers representing the Measured Min Hold Trace data (in dBm).
5	Upper Mask Trace data This returns comma-separated floating point numbers representing the Upper Mask Trace data (in dBm).
6	Lower Mask Trace data This returns comma-separated floating point numbers representing the Lower Mask Trace data (in dBm).

7	Averaged absolute power of the regions This returns comma-separated float values representing the averaged absolute power of each region (in dBm) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Averaged absolute power of region A Averaged absolute power of region B Averaged absolute power of region C Averaged absolute power of region D Averaged absolute power of region E Averaged absolute power of region F Averaged absolute power of region G Averaged absolute power of region H Averaged absolute power of region I Averaged absolute power of region J Averaged absolute power of region K Averaged absolute power of region L
8	Averaged relative power of the regions This returns comma-separated float values representing the averaged relative power to the region specified as the power reference (in dB) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Averaged relative power of region A Averaged relative power of region B Averaged relative power of region C Averaged relative power of region D Averaged relative power of region E Averaged relative power of region F Averaged relative power of region G Averaged relative power of region H Averaged relative power of region I Averaged relative power of region J Averaged relative power of region K Averaged relative power of region L

9	Max hold absolute power of the regions This returns comma-separated float values representing the maximum hold absolute power of each region (in dBm) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Max hold absolute power of region A Max hold absolute power of region B Max hold absolute power of region C Max hold absolute power of region D Max hold absolute power of region E Max hold absolute power of region F Max hold absolute power of region G Max hold absolute power of region H Max hold absolute power of region I Max hold absolute power of region J Max hold absolute power of region K Max hold absolute power of region L
10	Max hold relative power of the regions This returns comma-separated float values representing the maximum hold relative power to the region specified as the power reference (in dB) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Max hold relative power of region A Max hold relative power of region B Max hold relative power of region C Max hold relative power of region D Max hold relative power of region E Max hold relative power of region F Max hold relative power of region G Max hold relative power of region H Max hold relative power of region I Max hold relative power of region J Max hold relative power of region K Max hold relative power of region L

11	Min hold absolute power of the regions This returns comma-separated float values representing the minimum hold absolute power of each region (in dBm) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Min hold absolute power of region A Min hold absolute power of region B Min hold absolute power of region C Min hold absolute power of region D Min hold absolute power of region E Min hold absolute power of region F Min hold absolute power of region G Min hold absolute power of region H Min hold absolute power of region I Min hold absolute power of region J Min hold absolute power of region K Min hold absolute power of region L
12	Min hold relative power of the regions This returns comma-separated float values representing the minimum hold relative power to the region specified as the power reference (in dB) for each burst in capture length. The total number of returned values is 12 * number of bursts found. Min hold relative power of region A Min hold relative power of region B Min hold relative power of region C Min hold relative power of region D Min hold relative power of region E Min hold relative power of region F Min hold relative power of region G Min hold relative power of region H Min hold relative power of region I Min hold relative power of region J Min hold relative power of region K Min hold relative power of region L

13	Minimum relative level to the upper limit mask This returns comma-separated float values representing the minimum relative level to the upper limit mask of each region (in dB) for each burst in capture length. The total number of returned values is 12 * number of bursts found. If this value is negative or zero for a region, judgment passes with the upper mask of the region. If this value is positive for a region, judgment fails with the upper mask of the region. Minimum relative level to the upper limit mask of region A Minimum relative level to the upper limit mask of region B Minimum relative level to the upper limit mask of region C Minimum relative level to the upper limit mask of region D Minimum relative level to the upper limit mask of region E Minimum relative level to the upper limit mask of region F Minimum relative level to the upper limit mask of region G Minimum relative level to the upper limit mask of region H Minimum relative level to the upper limit mask of region I Minimum relative level to the upper limit mask of region J Minimum relative level to the upper limit mask of region K Minimum relative level to the upper limit mask of region L

14	Minimum relative level to the lower limit mask This returns comma-separated float values representing the minimum relative level to the lower limit mask of each region (in dB) for each burst in capture length. The total number of returned values is 12 * number of bursts found. If this value is positive or zero for a region, judgment passes with the lower mask of the region. If this value is negative for a region, judgment fails with the lower mask of the region. Minimum relative level to the lower limit mask of region A Minimum relative level to the lower limit mask of region B Minimum relative level to the lower limit mask of region C Minimum relative level to the lower limit mask of region D Minimum relative level to the lower limit mask of region E Minimum relative level to the lower limit mask of region F Minimum relative level to the lower limit mask of region G Minimum relative level to the lower limit mask of region H Minimum relative level to the lower limit mask of region I Minimum relative level to the lower limit mask of region J Minimum relative level to the lower limit mask of region K Minimum relative level to the lower limit mask of region L

SPAN X Scale

Accesses the SPAN/X Scale menu that allows you to set the desired horizontal scale settings.

Key Path	**Front Panel**

Ref Value

Allows you to set the display X reference value.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:PVT:VIEW:WIND:TRACE:X:RLEV 1s
Restriction and Notes	If X Auto Scaling is On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scaling is automatically set to Off.
Dependencies/Couplings	See Restriction and Notes
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	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	:DISP:PVT:VIEW:WIND:TRACE:X:PDIVision 1ms

Restriction and Notes	If X Auto Scaling is set to On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scaling is automatically set to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	1.0 ms
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 X reference position to the left, center, or right of the display..

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	:DISP:PVT:VIEW:WIND:TRACE:X:RPOS LEFT
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	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	:DISP:PVT:VIEW:WIND:TRACE:X:COUPLE OFF

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 manually set a value to either X Rel Value or X Scale/Div, X Auto Scaling is automatically set to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

AMPTD Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

Key Path	**Front Panel**

Ref Value

Sets the absolute power reference.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISPlay:PVTime:VIEW:WINDow:TRACe:Y:SCALe:RLEVel 5dbm
Dependencies/Couplings	When Y Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Y Auto Scaling is automatically set to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, Attenuation in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale, Attenuation**

Scale/Div

Allows you to enter a numeric value to change vertical display sensitivity.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISPlay:PVT:VIEW:WINDow:TRACe:Y:SCALe:PDIVision 10dB
Dependencies/Couplings	When the Y Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set a value manually, Y Auto Scaling is automatically set to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Key Path	**AMPTD Y Scale**

Presel Center

Optimizes the preselector settings for the current measurement.

See AMPTD Y Scale, Presel Center in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

Presel Adjust

Allows you to adjust the preselector settings for the current measurement.

See AMPTD Y Scale, Presel Adjust in the “Analyzer Setup Functions” section for more information.

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

Allows you to set the display reference position to the top, center, or bottom of the display......

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISPl:PVT:VIEW:WINDow:TRACe:Y:SCAL:RPOSition CENTer
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale**

Auto Scaling

Allows you to toggle the Y axis Auto Scaling function between On and Off.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:PVT:VIEW:WIND:TRACE:Y:COUPLE?
Dependencies/Couplings	When Auto Scaling is On, and you press the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you manually set a value for the Y Rel Value or Y Scale/Div, this parameter is automatically set to Off.
Preset	ON
State Saved	Saved in instrument state.

Range	On | Off
Key Path	**AMPTD Y Scale**

View/Display

Accesses the View/Display menu for the current measurement. This menu includes the Display key which allows you to access parameters that control the display. All softkeys in the “View/Display” menu work regardless of which result window currently has the focus.

For example, the scroll function works on the lower numeric result window even if the upper RF Envelope window currently has the focus.

See View/Display in the "Measurement Functions" section for more information

Key Path	**View/Display**

Display

Accesses parameters that affect the display.

Key Path	**View/Display**

Change Title

Allows you to modify the title shown in the display.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:PVTime:ANNotation:TITLe:DATA <string>`
	`:DISPlay:PVTime:ANNotation:TITLe:DATA?`
Example	DISP:PVT:ANN:TITL:DATA “Agilent”
Preset	Power vs Time
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Limit Mask

Turns the limit mask On or Off.

Mode	WiMAX OFDMA

Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:LMASk ON|OFF|1|0`
	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:LMASk?`
Example	:DISP:PVT:VIEW:WIND:LMAS ON
	:DISP:PVT:VIEW:WIND:LMAS?
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**View/Display**

Scroll

Accesses the Scroll menu, which contains features that enable you to navigate the display.

Key Path	**View/Display**

Prev Page

Moves the display one page back to the previous page of the result metrics window.

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

Next Page

Moves the display one page forward to the next page of the result metrics window.

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

Scroll Up

Moves one line upward from the current line of the result metrics window.

Pressing the up arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the up arrow hard key controls the active function, but has no effect on line movement..

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

Scroll Down

Moves one line downward from the current line of the result metrics window.

Pressing the down arrow hard key has the same effect as this function, if no active function is shown. If an active function is shown, the up arrow hard key controls the active function, but has no effect on line movement, as the Scroll Down function does.

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

First Page

Moves the display to the first page of the result metrics window.

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

Last Page

Moves the display to the last page of the result metrics window.

Mode	WiMAX OFDMA
Key Path	**View/Display, Scroll**

Trace/Detector

Accesses a menu that allows you to control trace settings.

Key Path	**Trace/Detector**

Max Hold Trace

This key allows you to make the Max Hold Trace visible or invisible in the display..

Mode	WiMAX OFDMA
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:TRACE:MAXH ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Min Hold Trace

This key allows you to make the Min Hold Trace visible or invisible in the display.

Mode	WiMAX OFDMA
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:TRACE:MINH ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

BW

Accesses a menu that allows you to control bandwidth settings.

Key Path	**BW**

Info BW

Sets the information bandwidth. This is the bandwidth used for the power measurement. The optimal setting occurs when the bandwidth is wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise, which reduces dynamic range and diminishes the accuracy of low level measurements.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:BANDwidth[:RESolution] <bandwidth>` `[:SENSe]:PVTime:BANDwidth[:RESolution]?`
Example	:PVT:BAND 1 KHZ
Preset	10 MHz
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 a Gaussian or a Flattop filter. A Gaussian is typically preferred but a Flattop is desirable under certain conditions.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:BANDwidth:TYPE GAUSsian|FLATtop` `[:SENSe]:PVTime:BANDwidth:TYPE?`
Example	:SENS:PVT:BAND:TYPE GAUS

Restriction and Notes	This selects either a Gaussian or Flat (Flattop) filter. Gaussian is the better choice when looking at the overall burst, or rising and falling edges, because it has excellent pulse response. For most Time vs. Power measurements, the user is not mainly interested in trading off time domain accuracy vs. noise, but is more interested in total power accuracy vs. noise. If you want to want to examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, that provides the best amplitude accuracy. GAUSsian – a filter with Gaussian characteristics, that provides the best pulse response.
Preset	FLATtop
State Saved	Saved in instrument state.
Range	Gaussian|Flattop
Key Path	**BW**

Meas Setup

Accesses the measurement setup menu for the current measurement.

Key Path	**Meas Setup**

Avg/Hold Num

Used to specify the number of data acquisitions that will be averaged. After the specified number of average counts, the averaging mode (termination control) setting determines the averaging action.

On - Sets measurement averaging on.

Off - Sets measurement averaging off.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:AVERage:COUNt <integer>`
	`[:SENSe]:PVTime:AVERage:COUNt?`
	`[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:PVTime:AVERage[:STATe]?`
Preset	50
	ON
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.

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. The default value is Exp.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:PVTime:AVERage:TCONtrol?`
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Key Path	**Meas Setup**

Avg Type

Specifies the type of trace and result averaging to use.

This parameter is valid only for Measure Trace.

KEY: Pwr Avg (RMS) SCPI: RMS|POWer	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY: Log-Pwr Avg (Video) SCPI: LOG|LPOWer	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:AVERage:TYPE LOG|LPOWer|RMS|POWer` `[:SENSe]:PVTime:AVERage:TYPE?`
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg(Video)
Key Path	**Meas Setup**

Capture Length

Specifies capture length.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:SWEep:TIME <integer>`
	`[:SENSe]:PVTime:SWEep:TIME?`
Example	:SENS:PVT:SWP:TIME 1
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	4
Key Path	**Meas Setup**

Burst Sync

Specifies the method used to detect a burst.

KEY: RF Amptd SCPI: RFBurst	The measurement algorithm searches for a burst that satisfies the burst detection parameters such as Threshold Lvl and Burst Slope Threshold. The search is performed from the beginning of the capture data.
KEY: None SCPI: NONE	The measurement algorithm does not search a burst at all. Instead, the algorithm assumes that the burst begins from the trigger timing setting (e.g. RF Burst Trigger or External Trigger) and lasts for a predefined period as determined by the region limit setting. This means you need to set the external trigger to exactly the same setting as the burst rising setting.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:BSYNc:SOURce RFBurst|NONE`
	`[:SENSe]:PVTime:BSYNc:SOURce?`
Example	:SENS:PVT:BSYN:SOUR?
Preset	RFBurst
State Saved	Saved in instrument state.
Range	RF Amptd | None
Key Path	**Meas Setup**

Region/Limits

Accesses the Region/Limits menu allows you to set up the test limit mask for the specified time period. A time period is called a region. You can define multiple regions. The start and stop time of the regions, and the absolute or relative power of the upper and lower limit masks for the regions, are configurable.

Key Path	**Meas Setup**

Region

Time slices along the burst are called regions. You can define up to 12 regions, which are designated by the characters A to L. You can configure the following parameters for each region: Start Time, Stop Time, Upper Abs Start, Upper Abs Stop, Upper Rel Start, Upper Rel Stop, Upper Fail Mask, Lower Abs Start, Lower Abs Stop, Lower Rel Start, Lower Rel Stop and Lower Fail Mask.

Mode	WiMAX OFDMA
Preset	A
Range	A I B I C I D I E I F I G I H I I I J I K I L
Key Path	**Meas Setup, Region/Limits**

Start Time

Specifies the start time for each region.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:TIME:STARt <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:PVTime:MASK[1]|2:LIST:TIME:STARt?`
	`:CALCulate:PVTime:MASK[1]|2:LIST:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:PVTime:MASK[1]|2:LIST:STATe?`

Example	:CALC:PVT:MASK2:LIST:TIME:STAR? :CALC:PVT:MASK1:LIST:STAT?

Restriction and Notes	The time is relative to the T0 point. A value must be entered for all regions. A value of 0 must be entered for those regions to which this parameter is not being applied.
Dependencies/Couplings	Coupled to Stop Time. When Start Time is set to a larger value than the Stop Time, the Stop Time is forced to increase to the same value as the new Start Time. When Stop Time is set to a smaller value than the Start Time, the Start Time is forced to decrease to the same value as the new Stop Time.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	–1.0, –0.00501, –0.005, 0.005, 0.00501, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0
State Saved	Saved in instrument state.
Min	–1.0 sec
Max	1.0 sec
Key Path	**Meas Setup, Region/Limits**

Stop Time

Specifies the stop time of each region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:TIME:STOP <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:PVTime:MASK[1]|2:LIST:TIME:STOP?`
Example	:CALC:PVT:MASK2:LIST:TIME:STOP?
Restriction and Notes	The time is relative to the T0 point. A value must be entered for all regions. A value of 0 must be entered for those regions to which this parameter is not being applied.
Dependencies/Couplings	Coupled to Start Time. When Start Time is set to a larger value than the Stop Time, the Stop Time is forced to increase to the same value as the new Start Time. When Stop Time is set to a smaller value than the Start Time, the Start Time is forced to decrease to the same value as the new Stop Time.

Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS. .
Preset	–50.0e-6, 0.0, –50.0e-6, –500, 2.5e-3,4.8e-3, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–1.0 sec
Max	1.0 sec
Key Path	**Meas Setup, Region/Limits**

Upper Abs Start

Specifies the absolute power level limit at the start time of the selected region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STARt:ABSolute <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STARt:ABSolute?`
Example	:CALC:PVT:MASK2:LIST:UPPer:STAR:ABS?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions to which this parameter is not being applied.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0,0.0,0.0, 200.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dBm
Max	200 dBm
Key Path	**Meas Setup, Region/Limits**

Upper Abs Stop

Specifies the absolute power level limit at the stop time of the selected region. The parameter can be toggled between Auto and Man. If set to Auto, this parameter is coupled to Upper Abs Start to make a flat limit line. If set to Man, Upper Abs Start and Upper Abs

Stop can be assigned different values to make a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:ABSolute <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:ABSolute?`
	`:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:ABSolute:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:ABSolute:AUTO?`

Example	:CALC:PVT:MASK1:LIST:UPPer:STOP:ABS? :CALC:PVT:MASK1:LIST:UPPer:STOP:ABS:AUTO?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions to which this parameter is not being applied.
Dependencies/Couplings	Coupled to Upper Abs Start, if coupling is set to “Auto”. In this case, Upper Abs Stop keeps the same value as Upper Abs Start.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dBm
Max	50 dBm
Key Path	**Meas Setup, Region/Limits**

Upper Rel Start

Specifies the relative power level limit at the start time of the selected region. The reference power level is specified by the Power Reference parameter)

Mode	WiMAX OFDMA

Remote Command	:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STARt:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> :CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STARt:RELative?
Example	:CALC:PVT:MASK:LIST:UPPer:STAR:REL?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions to which this parameter is not being applied.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	-25.0, 16.0, 16.0, 7.0, -25.0, 200.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dB
Max	200 dB
Key Path	**Meas Setup, Region/Limits**

Upper Rel Stop

Specifies the relative power level limit at the stop time of the selected region. The parameter can be toggled between Auto and Man. If set to Auto, this parameter is coupled to Upper Rel Start to make a flat limit line. If set to Man, Upper Rel Start and Upper Rel Stop can be assigned different values to make a sloped limit line.

Mode	WiMAX OFDMA
Remote Command	:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl> :CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:RELative? :CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:RELative:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0 :CALCulate:PVTime:MASK[1]|2:LIST:UPPer:STOP:RELative:AUTO?
Example	:CALC:PVT:MASK:LIST:UPPer:STOP:REL? :CALC:PVT:MASK1:LIST:UPPer:STOP:REL:AUTO?

Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions for which this parameter is not being applied.
Dependencies/Couplings	Coupled to Upper Abs Start, if coupling is set to “Auto”. In this case, Upper Rel Stop keeps the same value as Upper Rel Start.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dB
Max	200 dB
Key Path	**Meas Setup, Region/Limits**

Upper Fail Mask

Specifies the fail condition of the upper limit for the selected region.

KEY: Absolute SCPI: ABSolute	The measurement reports “FAIL” if the result exceeds the upper absolute limit.
KEY: Relative SCPI: Relative	The measurement reports “FAIL” if the result exceeds the upper relative limit.
KEY: Abs AND Rel SCPI: AND	The measurement reports “FAIL” if the result exceeds both the upper absolute limit and the upper relative limit.
KEY: Abs OR Rel SCPI: AND	The measurement reports “FAIL” if the result exceeds either the upper absolute limit or the upper relative limit.

Mode WiMAX OFDMA

Remote Command

```
:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:TEST
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,
ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,

:CALCulate:PVTime:MASK[1]|2:LIST:UPPer:TEST?
```

Example :CALC:PVT:MASK2:LIST:UPPer:TEST?

Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	REL, REL, REL, REL, REL, REL, ABS, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute | Relative | Abs AND Rel | Abs OR Rel
Key Path	**Meas Setup, Region/Limits**

Lower Abs Start

Specifies the absolute power level limit at the start time of the selected region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STARt:ABSolute <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>` `:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STARt:ABSolute?`
Example	:CALC:PVT:MASK2:LIST:LOWer:STAR:ABS?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions for which this parameter is not being applied.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	–200.0, –200.0, –200.0, –200.0, –200.0, –200.0, –200.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dBm
Max	200 dBm
Key Path	**Meas Setup, Region/Limits**

Lower Abs Stop

Specifies the absolute power level limit at the stop time of the selected region. The parameter can be toggled between Auto and Man. If set to Auto, this parameter is coupled to Lower Abs Start to make a flat limit line. If set to Man, Lower Abs Start and Lower Abs

Stop can be assigned different values to make a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:ABSolute <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:ABSolute?`
	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:ABSolute:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:ABSolute:AUTO?`

Example	:CALC:PVT:MASK1:LIST:LOWer:STOP:ABS? :CALC:PVT:MASK1:LIST:LOWer:STOP:ABS:AUTO?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions for which this parameter is not being applied.
Dependencies/Couplings	Coupled to Lower Abs Start, if coupling is set to “Auto”. In this case, Lower Abs Stop keeps the same value as Lower Abs Start.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dBm
Max	200 dBm
Key Path	**Meas Setup, Region/Limits**

Lower Rel Start

Specifies the relative power level limit at the start time of the selected region. The reference power level is specified by the Power Reference parameter.

Mode	WiMAX OFDMA

Remote Command

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STARt:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>
```

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STARt:RELative?
```

Example	:CALC:PVT:MASK:LIST:LOWer:STAR:REL?
Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions for which this parameter is not being applied.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dB
Max	200 dB
Key Path	**Meas Setup, Region/Limits**

Lower Rel Stop

Specifies the relative power level limit at the stop time of the selected region. The parameter can be toggled between Auto and Man. If set to Auto, this parameter is coupled to Lower Rel Start to make a flat limit line. If set to Man, Lower Rel Start and Lower Rel Stop can be assigned different values to make a sloped limit line.

Mode	WiMAX OFDMA

Remote Command

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:RELative <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>
```

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:RELative?
```

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:RELative:AUTO ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0
```

```
:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:STOP:RELative:AUTO?
```

Example	:CALC:PVT:MASK:LIST:LOWer:STOP:REL?
	:CALC:PVT:MASK1:LIST:LOWer:STOP:REL:AUTO?

Restriction and Notes	A value must be entered for all regions. A value of 0 may be entered for those regions for which this parameter is not being applied.
Dependencies/Couplings	Coupled to Lower Abs Start, if coupling is set to “Auto”. In this case, Lower Rel Stop keeps the same value as Lower Rel Start.
Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	0.0, 0.0, 0.0, 0.0, 0.0, 0.0 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
State Saved	Saved in instrument state.
Min	–200 dB
Max	200 dB
Key Path	**Meas Setup, Region/Limits**

Lower Fail Mask

Specifies the fail condition of the lower limit for the selected region.

KEY: Absolute SCPI: ABSolute	The measurement reports “FAIL” if the result exceeds the lower absolute limit.
KEY: Relative SCPI: Relative	The measurement reports “FAIL” if the result exceeds the lower relative limit.
KEY: Abs AND Rel SCPI: AND	The measurement reports “FAIL” if the result exceeds both the lower absolute limit and the lower relative limit.
KEY: Abs OR Rel SCPI: AND	The measurement reports “FAIL” if the result exceeds either the lower absolute limit or the lower relative limit.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:TEST ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR, ABSolute|RELative|AND|OR,` `:CALCulate:PVTime:MASK[1]|2:LIST:LOWer:TEST?`
Example	:CALC:PVT:MASK2:LIST:LOWer:TEST?

Remote Command Notes	Comma separated list of 12 values. MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	ABS, ABS, ABS, ABS, ABS, ABS, ABS, REL, REL, REL, REL, REL
State Saved	Saved in instrument state.
Range	Absolute | Relative | Abs AND Rel | Abs OR Rel
Key Path	**Meas Setup, Region/Limits**

Power Reference

Specifies a region, the power level of which is used to set the reference power level for the relative limit mask of all regions.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:PREFerence A|B|C|D|E|F|G|H|I|J|K|L` `:CALCulate:PVTime:MASK[1]|2:PREFerence?`
Example	:CALC:PVT:MASK1:PREF?
Remote Command Notes	MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	D
State Saved	Saved in instrument state.
Range	Region A | Region B | Region C | Region D Region E | Region F | Region G | Region H | Region I | Region J | Region K | Region L
Key Path	**Meas Setup**

Time Reference

Specifies a reference position along the burst for start time and stop time settings for all regions. If you want to fine tune the reference position, set the Time Ref Offset parameter in the Advanced menu (See “Time Ref Offset” on page 704)

KEY: Burst Rising SCPI: RISE	Uses the burst rising timing as the time reference in applying the limit mask.

KEY: Burst Center SCPI: CENTer	Uses the burst center timing as the time reference in applying the limit mask.
KEY: Trigger SCPI: TRIGger	Uses the trigger timing as the time reference in applying the limit mask.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MASK[1]|2:TREFerence RISE|CENTer|TRIGger` `:CALCulate:PVTime:MASK[1]|2:TREFerence?`
Example	:CALC:PVT:MASK1:TREF?
Remote Command Notes	MASK1 is for BTS, 2 for MS. Default is BTS.
Preset	RISE
State Saved	Saved in instrument state.
Range	Burst Rising | Burst Center | Trigger
Key Path	**Meas Setup**

Meas Preset

Returns parameters for the current measurement to those set by the factory.

Remote Command	`:CONFigure:PVTime`
Example	:CONF:PVT
Key Path	**Meas Setup**

Advanced

Accesses advanced measurement setup features. These features are intended for the advanced user.

Key Path	**Meas Setup**

Threshold Lvl

If Burst Sync is set to RF Amptd, the measurement algorithm looks for a burst in the captured data. This parameter determines the power level above which the algorithm will consider any burst as a candidate for a valid burst.

Burst Search Slope Threshold and Burst Search Slope Detect Time are also used in the burst detection algorithm.

Mode	WiMAX OFDMA

Remote Command	`[:SENSe]:PVTime:BURSt:THReshold <real>`
	`[:SENSe]:PVTime:BURSt:THReshold?`
	`[:SENSe]:PVTime:BURSt:THReshold:TYPE ABSolute|RELative`
	`[:SENSe]:PVTime:BURSt:THReshold:TYPE?`

Example	:SENS:PVT:BURS:THR? :SENS:PVT:BURS:THR:TYPE?
Restriction and Notes	This command does not accept units such as dBm or dB.
Remote Command Notes	The BAF SCPI Command determines whether this command is set to an absolute or a relative power level. If the BAF choice is “Absolute”, this parameter is expressed in units of dBm. Both positive and negative values are allowed. If the BAF choice is “Relative”, this parameter is expressed in units of dB relative to the peak value for the capture length. Only negative values and zero are allowed. Positive values are clipped to zero.
Preset	–10.0 RELative
State Saved	Saved in instrument state.
Min	–100
Max	100
Key Path	**Meas Setup, Advanced**

Burst Slope Threshold

If Burst Sync is set to RF Amptd, the measurement algorithm looks for a burst in the captured data. This parameter specifies the minimum slope in the relative power level change per 1us. The slope of the captured signal power level must be greater than this parameter value in order to be considered as a valid burst.

"Threshold Lvl" on page 702 and "Burst Slope Detect Intvl" on page 703 are also used in the burst detection algorithm.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:BURSt:SLOPe <real>` `[:SENSe]:PVTime:BURSt:SLOPe?`
Example	:SENS:PVT:BURS:SLOP?
Remote Command Notes	This SCPI command does not accept units such as dB/ms.
Preset	-20.0
State Saved	Saved in instrument state.
Min	0.1
Max	10.0
Key Path	**Meas Setup, Advanced**

Burst Slope Detect Intvl

If Burst Sync is set to RF Amptd, the measurement algorithm looks for a burst in the captured data. This parameter specifies the time period for which the burst rising should keep the slope greater than Burst Search Slope Threshold in order to be considered as a valid burst.

"Threshold Lvl" on page 702 is also used in the burst detection algorithm.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:BURSt:SLOPe:DETection:TIME <time>` `[:SENSe]:PVTime:BURSt:SLOPe:DETection:TIME?`
Example	:SENS:PVT:BURS:SLOP:DET:TIME?
Preset	10.0 us
State Saved	Saved in instrument state.
Min	0.1us
Max	100.0 us
Key Path	**Meas Setup, Advanced**

Time Ref Offset

This parameter is used to fine tune the reference position of the limit masks that has been specified by start time and stop time pairs. See "Time Ref Offset" on page 704 for the course positioning of the time reference.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:TREFerence[:OFFSet]:TIME <time>`
	`:CALCulate:PVTime:TREFerence[:OFFSet]:TIME?`
Example	:SENS:PVT:TREF:OFFS:TIME?
Preset	0.0
State Saved	Saved in instrument state.
Min	–10.0 ms
Max	10.0 ms
Key Path	**Meas Setup, Advanced**

IF Gain

Accesses the menu that sets ranging in the digital IF when acquiring an I/Q time record. Note: This function is not affected by RF Input Range attenuation.

Key Path	**Meas Setup, Advanced,**

IF Gain Auto Allows the instrument to pick the IF Gain method that is appropriate. This "Auto" state is set by the Auto Couple key, and it always selects "Low Gain" for the IF Gain State.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:IF:GAIN:AUTO OFF|ON|0|1`
	`[:SENSe]:PVTime:IF:GAIN:AUTO?`
Example	`:SENSe:PVTime:IF:GAIN:AUTO ON`

Dependencies/Couplings	When this parameter is set to “ON”, the IF Gain State parameter is set to “LOW”. When this parameter is set to “OFF”, the IF Gain State parameter does not change, and keeps its previous value.
Preset	ON
State Saved	Saved in instrument state.
Key Path	**Meas Setup, Advanced, IF Gain**

IF Gain State Set the digital IF gain.

KEY: Low Gain SCPI: LOW	Low gain. This setting is optimal for Large Signals.
KEY: High Gain SCPI: HIGH	High gain. This setting is optimal for Noise Level.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:PVTime:IF:GAIN[:STATe] LOW|HIGH` `[:SENSe]:PVTime:IF:GAIN[:STATe]?`
Example	`:SENSe:PVTime:IF:GAIN HIGH`
Dependencies/Couplings	Couple to IF Gain Auto force it to Man.
Preset	LOW
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Key Path	**Meas Setup, Advanced, IF Gain**

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.

See Triggers in the "Measurement Functions" section for more information

Allows you to choose a trigger source. Trigger settings are Measurement Global. See Triggers in the "Measurement Functions" section for more information on 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 signals.
KEY: Video SCPI: IF|VIDeo	An internal IF envelope trigger. It triggers on an absolute threshold level of the signal passed by the IF.
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 (also known as the frame clock) to generate a trigger signal.

Mode	WiMAX OFDMA
Remote Command	`:TRIGger:PVTime[:SEQuence]:SOURce IMMediate|IF|VIDeo|EXTernal[1]|EXTernal2|RFBurst |FRAMe` `:TRIGger:PVTime[:SEQuence]:SOURce?`
Preset	RFBurst
State Saved	Saved in instrument state.
Range	Free Run | Video | External 1 | External 2 | RF Burst | Periodic Timer
Key Path	**Trigger**
History	The Parameters ‘IF’ and ‘VIDeo’ are the same; they are both used to refer to ‘Video’, and are coupled to each other.

Auto Trig

Toggles the auto trigger feature between On and Off. See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Trigger**

Trig Hold Off

Toggles the trigger hold off feature between On and Off. See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Trigger**

Sweep/Control

Accesses a menu that allows you to select parameters that affect the sweep of the displayed measurement signal.

Only the Pause/Resume key is available. See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Front Panel**

Sweep/Control

Accesses a key that allows you to pause or resume the measurement of a displayed signal.

See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Sweep/Control**

Marker

Accesses the menu that allow you to select, set up, and control the markers for the current measurement. Sets the marker control mode as described under **Normal**, **Delta**, **Fixed** and **Off**, below. All interactions and dependencies detailed under the softkey description are enforced when the remote command is sent.

See Marker in the "Measurement Functions" section for more information

Key Path	**Marker**

Marker Type

Allows you to select a marker type for a given marker.

Mode	WiMAX OFDMA
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
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 in the Active Function area. Default Active Function: the active function for the selected marker's current control mode. Note that if the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its fully entered precision.
Remote Command Notes	NORMal is changed to POSition in the new SA.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal | Delta | Off
Key Path	**Marker**

Select Marker

Accesses menus that allow you to activate one or more markers

Key Path	**Marker**

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	WiMAX OFDMA
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?
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 “Invalid suffix” error will be generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker, if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **off** the response is not a number (NAN).
Dependencies/Couplings	Max value would be changed by Meas Time parameter value.
Preset	After a preset, all markers are turned OFF, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Key Path	**Marker, Normal**

Marker X Axis Position

Sets the marker X position in trace points, This allows you to enter a value in trace points rather than in X Axis Scale units. The entered value is immediately converted into the current X Axis Scale unit for setting the value of the marker. 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	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition <real>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :X:POSition?`
Example	:CALC:PVT:MARK10:X:POS?
Restriction and Notes	A 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 (NAN).
Preset	After a preset, all markers are turned Off, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37

Marker Y Axis Value

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

The "result" of a marker is the value that is displayed on the second line of the Marker Result block. To properly interpret the returned value, you must also know how the analyzer's Y-Axis Unit is set, as described below.

A marker can have up to two results, only one of which is displayed or returned in a query, as follows:

Absolute result: every marker has an absolute result.

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 as 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 in 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	WiMAX OFDMA
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	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number (NAN).
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

Accesses menus that allow you to select one or more markers

Key Path	**Marker**

Relative To

Selects the marker that the selected marker will be relative to, which is referred to as its “reference marker”.

Mode	WiMAX OFDMA
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?
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 will be 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	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe RF|UMASk|LMASk|MAXHold|MINHold` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :TRACe?`
Example	:CALC:PVT:MARK:TRACE?
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**

Couple Marker

When this function is invoked, moving any marker causes an "equal X Axis movement" of every other marker which is active. By "equal X Axis movement" we mean that the difference between each marker's X Axis value (in the fundamental x-axis units of the trace that marker is on) is preserved, as is the X Axis value of the marker being moved (in the same fundamental X-axis units).

NOTE: This may result in markers going off screen.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:PVTime:MARKer:COUPle[:STATe]?`
Example	CALC:PVT:MARK:COUP ON
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker**

All Markers Off

Turns all markers Off.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MARKer:AOFF`
Example	:CALC:PVT:MARK:AOFF
Key Path	**Marker**

Peak Search

Places the selected marker on the trace point that has the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker Off causes the selected marker to be set to Normal; then a peak search is immediately performed.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12 :MAXimum`
Example	CALC:PVT:MARK2:MAX
Key Path	**Peak Search**

Marker To

There is no 'Marker To' functionality supported in Power vs. Time so this front-panel key will display a blank softkey when pressed

Key Path	**Marker**

Marker Function

There are no ‘Marker Functions’ supported in Power vs. Time so this front-panel key will display a blank softkey when pressed.

Key Path	**Marker**

12 Modulation Analysis

Invokes Modulation Analysis measurement, including Spectrum Flatness measurement. Scroll down for more information.

Key Path: **Meas**

`:CONFigure:EVM`

`:INITiate:EVM`

`:FETCh:EVM[n]?`

`:READ:EVM[n]?`

`:MEASure:EVM[n]?`

n	Results Returned
0	Returns unprocessed I/Q trace data of Capture Interval, as a series of trace point values. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

1 (or not specified)	Returns the following comma-separated scalar results: Averaged Total RMS RCE (EVM) in dB – a floating point number in dB Averaged Total RMS RCE (EVM) in % – a floating point number in percentage Max Total RMS RCE (EVM) in dB – a floating point number in dB Max Total RMS RCE (EVM) in % – a floating point number in percentage Standard Deviation of Total RMS RCE (EVM) in dB – a floating point number in dB Standard Deviation of Total RMS RCE (EVM) in % – a floating point number in percentage Averaged Peak RMS RCE (EVM) in dB – a floating point number in dB. This is a result of composite subcarriers in each symbol. Averaged Peak RMS RCE (EVM) in % – a floating point number in percentage. This is a result of composite subcarriers in each symbol. Max Peak RMS RCE (EVM) in dB – a floating point number in dB. This is a result of composite subcarriers in each symbol. Max Peak RMS RCE (EVM) in % – a floating point number in percentage. This is a result of composite subcarriers in each symbol. Max Peak RMS RCE Symbol Number – an integer number at which the peak RCE is detected. Max Peak RMS RCE Subcarrier Number – an integer number at which the peak RCE is detected Standard Deviation of Peak RMS RCE (EVM) in dB – a floating point number in dB. This is a result of composite subcarriers in each symbol. Standard Deviation of Peak RMS RCE (EVM) in % – a floating point number in percentage. This is a result of composite subcarriers in each symbol. Averaged Pilot RCE in dB – a floating point number in dB. Averaged Pilot RCE in % – a floating point number in percentage. Max Pilot RCE in dB – a floating point number in dB. Max Pilot RCE in % – a floating point number in percentage. Standard Deviation of Pilot RCE in dB – a floating point number in dB. Standard Deviation of Pilot RCE in % – a floating point number in percentage. Averaged RMS RCE of unmodulated subcarriers in dB – a floating point number in dB. This measurement is based on the requirement of IEEE Std 802.16 2004-Cor1, section 8.4.12.3.4. Averaged RMS RCE of unmodulated subcarriers in % – a floating point number in %. This measurement is based on the requirement of IEEE Std 802.16 2004-Cor1, section 8.4.12.3.4. (Continued next page)

1 (or not specified) Continued	Max RMS RCE of unmodulated subcarriers in dB - a floating point number in dB. Max RMS RCE of unmodulated subcarriers in % - a floating point number in %. Standard Deviation of RMS RCE of unmodulated subcarriers in dB - a floating point number in dB. Standard Deviation of RMS RCE of unmodulated subcarriers in % - a floating point number in %. Averaged RMS Frequency Error – a floating point number in Hz. Max RMS Frequency Error – a floating point number in Hz. Standard Deviation of Frequency Error – a floating point number in Hz. Averaged IQ Origin Offset – a floating point number in dB. Max IQ Origin Offset – a floating point number in dB. Standard Deviation of IQ Origin Offset – a floating point number in dB. Averaged Symbol Clock Error – a floating point number in ppm. Max Symbol Clock Error – a floating point number in ppm. Standard Deviation of Symbol Clock Error – a floating point number in ppm. Averaged Sync Correlation – a floating point number with no units which denotes an indicator of the synchronization. Max Sync Correlation – a floating point number with no units which denotes an indicator of the synchronization. Standard Deviation of Sync Correlation – a floating point number with no units which denotes an indicator of the synchronization. Averaged Time Offset – a floating point number in seconds. Max Time Offset – a floating point number in seconds. Standard Deviation of Time Offset – a floating point number in seconds. Averaged RSSI- a floating point number in dBm. Max RSSI – a floating point number in dBm Standard Deviation of RSSI- a floating point number in dBm. Averaged FFT Total Power – a floating point number in dBm. Max FFT Total Power – a floating point number in dBm. Standard Deviation of FFT Total Power – a floating point number in dBm. Channel power – a floating number in dBm. OBW – a floating number in Hz PRBS – an integer number IDCell – an integer number (Continued Next Page)

1 (or not specified) Continued	Segment – an integer number Mean Transmit Power – a floating point number in dBm. Nominal BW – a floating point number in Hz. Abs Max Subcarrier Power (dBm) – a floating point number in dBm. Abs Max Subcarrier Power (dBc) – a floating point number in dBc. Abs Max Subcarrier Power to Upper Limit – a floating point number in dB. Abs Max Subcarrier Power Index – an integer number. Abs Min Subcarrier Power (dBm) - a floating point number in dBm. Abs Min Subcarrier Power (dBc) - – a floating point number in dBc. Abs Min Subcarrier Power to Lower Limit – a floating point number in dB. Abs Min Subcarrier Power Index – an integer number. Diff Max Subcarrier Power - a floating point number in dB. Diff Max Subcarrier Power to Upper Limit – a floating point number in dB. Diff Max Subcarrier Power Index – an integer number. Diff Min Subcarrier Power - a floating point number in dB. Diff Min Subcarrier Power to Lower Limit – a floating point number in dB. Diff Min Subcarrier Power Index – an integer number. Sampling Frequency – a floating point number in Hz.
2	Symbol Error trace returns series of floating point numbers (in dB) that represent each sample in the EVM trace of used subcarriers and symbols in measured zone. The order of the trace is as follows: 1st number: a value of 1st subcarrier/1st symbol 2nd number: a value of 2nd subcarrier/1st symbol … Nsub-th number: a value of Nsub-th subcarrier/1st symbol (Nsub+1)th number: a value of 1st subcarrier/2nd symbol … (Nsym*Nsub)th number: a value of Nsub-th subcarrier/Nsym-th symbol Where Nsub denotes number of used subcarriers and Nsym denotes number of symbols of the measured zone.

3	RMS Symbol Error vs Subcarrier returns series of floating point numbers (in dB) that represent error vector RMS'ed across symbols vs subcarrier. The order of the trace is as follows: 1st number: a value of 1st subcarrier 2nd number: a value of 2nd subcarrier … Nsub-th number: a value of Nsub-th subcarrier
4	RMS Symbol Error vs Symbol returns series of floating point numbers (in dB) that represent error vector RMS'ed across subcarriers vs symbol. The order of the trace is as follows: 1st number: a value of 1st symbol 2nd number: a value of 2nd symbol … Nsym-th number: a value of Nsym-th symbol
5	Symbol Power trace returns series of floating point numbers (in dBm) that represent each sample in the symbol power trace of used subcarriers and symbols in measured zone. The order of the trace is as follows: 1st number: a value of 1st subcarrier/1st symbol 2nd number: a value of 2nd subcarrier/1st symbol … Nsub-th number: a value of Nsub-th subcarrier/1st symbol (Nsub+1)th number: a value of 1st subcarrier/2nd symbol … (Nsym*Nsub)th number: a value of Nsub-th subcarrier/Nsym-th sym Where Nsub denotes number of used subcarriers and Nsym denotes number of symbols of the measured zone.
6	RMS Symbol Power vs Subcarrier returns series of floating point numbers (in dBm) that represent symbol power RMS'ed across symbols vs subcarrier. The order of the trace is as follows: 1st number: a value of 1st subcarrier 2nd number: a value of 2nd subcarrier … Nsub-th number: a value of Nsub-th subcarrier

7	RMS Symbol Power vs Symbol returns series of floating point numbers (in dBm) that represent symbol power RMS'ed across subcarriers vs symbol. The order of the trace is as follows: 1st number: a value of 1st symbol 2nd number: a value of 2nd symbol … Nsym-th number: a value of Nsym-th symbol
8	IQ measured trace returns 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 if "Normalized" is set to ON. The first number is the I sample of symbol 0 decision point and the second number is the Q sample of symbol 0 decision point. The order of the trace is as follows: 1st number: a value of I-ch of 1st subcarrier/1st symbol 2nd number: a value of Q-ch of 1st subcarrier/1st symbol 3rd number: a value of I-ch of 2nd subcarrier/1st symbol 4th number: a value of Q-ch of 2nd subcarrier/1st symbol … (Nsub*2–1)-th number: a value of I-ch of Nsub-th subcar/1st symbol (Nsub*2)-th number: a value of Q-ch of Nsub-th subcar/1st symbol (Nsub*2+1)th number: a value of I-ch of Nsub-th subcar/2nd symbol (Nsub*2+2)th number: a value of Q-ch of Nsub-th subcar/2nd symbol … (Nsym*Nsub*2–1)th number: a value of I-ch of Nsub-th subcarr/Nsym-th sym (Nsym*Nsub*2)th number: a value of Q-ch of Nsub-th subcarr/Nsym-th sym Where Nsub denotes number of used subcarriers and Nsym denotes number of symbols of the measured zone.
9	Channel Frequency Response (Spectral Flatness) – floating point numbers which denote the equalizer channel frequency response, which is the reciprocal of the equalizer frequency response. This has one point per subcarrier. The equalizer frequency response is normally estimated from the channel estimation sequence portion of the OFDMA preamble.
10	Spectral Flatness Upper Limit Mask – floating point numbers which denote the upper limit mask trace of spectral flatness.
11	Spectral Flatness Lower Limit Mask – floating point numbers which denote the lower limit mask trace of spectral flatness.

12	Adjacent subcarrier power difference in dB (Spectral Flatness Diff) – computed by scanning through the Channel Frequency Response trace and taking the ratio of each bin to the previous bin. If the signal does not use all subcarriers, the trace assumes a smooth interpolation between the subcarriers that are used.
13	Spectral Flatness Diff Upper Limit Mask – floating point numbers which denote the upper limit mask trace of spectral flatness difference.
14	Spectral Flatness Diff Lower Limit Mask – floating point numbers which denote the lower limit mask trace of spectral flatness difference.
15	Preamble Frequency Error – shows the total frequency error during the preamble portion of the OFDMA burst. Preamble Frequency Error is sampled at 256 times the subcarrier spacing.
16	Common Pilot Error – shows the complex difference between the measured and ideal pilot subcarrier symbols. Residual phase and frequency settling that occurs following the preamble is measured via the Common Pilot Error.
17	Data Burst Info – shows summary data for the active Data Burst. The shown Data Burst Number is designated by the parameter :CALCulate:EVM:INFormation:BURSt?. The array consists of following elements: Burst Type(int) 0 = Normal, 1 = FCH, 2 = DL-MAP Data Modulation Format 0 = QPSK–1/2 1 = QPSK–3/4 9 = QPSK-Unknown 10 = 16QAM–1/2 11 = 16QAM–3/4 19 = 16QAM-Unknown 20 = 64QAM–1/2 21 = 64QAM–2/3 22 = 64QAM–3/4 29 = 64QAM-Unknown Boosting Level in dB Subchannel Offset Subchannel Interval Symbol Offset Symbol Interval Burst power in dBm RCE of whole burst in dB RCE of data portion in dB
18	Demod Bit trace – shows Demod Bit Trace of the measured zone or burst.
19	FFT Spectrum trace – shows FFT Spectrum Trace

20	Time Domain trace – shows the time domain power trace of the burst.

SPAN X Scale

Accesses a menu of functions that allow you to set the horizontal scale parameters.

Mode	WiMAX OFDMA
Key Path	**Front-panel key**

Ref Value

Ref Value sets the reference value for the x-axis. Ref value SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

Mode	WiMAX OFDMA
Key Path	Span X

Ref Value (Error vs. Subcarrier Window)

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW3:WIND:TRAC:X:RLEV 0.0 DISP:EVM:VIEW3:WIND:TRAC:X:RLEV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000.0
Max	5000.0
Key Path	**SPAN/X Scale**

Ref Value (Symbol Power vs. Subcarrier Window)

Ref Value sets the reference value for the x-axis in the Symbol Power vs. Subcarrier window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW4:WIND:TRAC:X:RLEV 0.0 DISP:EVM:VIEW4:WIND:TRAC:X:RLEV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000.0
Max	5000.0
Key Path	**SPAN/X Scale**

Ref Value (Absolute Flatness Window/Differential Flatness Window)

Ref Value sets the reference value for the x-axis in the Absolute Flatness and Differential Flatness windows of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW6:WIND:TRAC:X:RLEV 0.0 DISP:EVM:VIEW6:WIND:TRAC:X:RLEV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes Values of WIND[1] and WIND2 are ALWAYS coupled with each other.
Preset	0.0

State Saved	Saved in instrument state.
Min	–5000.0
Max	5000.0
Key Path	**SPAN/X Scale**

Ref Value (Power vs Time Window)

Ref Value sets the reference value for the x-axis in the Power vs. Time window of the Power vs. Time & Spectrum view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW7:WIND:TRACE:X:RVAL 1s DISP:EVM:VIEW7:WIND:TRACE:X:RVAL?
Restriction and Notes	If X Auto Scaling is set to 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 WiMAX OFDMA mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s
State Saved	Saved in instrument state.
Min	1.0 s
Max	10.00 s
Key Path	**SPAN X Scale**

Ref Value (Symbol Error vs. Symbol Window)

Ref Value sets the reference value for the x-axis in the Symbol Error vs. Symbol window of the Symbol Error view.

Mode	WiMAX OFDMA

Remote Command	`:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel <real>`
	`:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW3:WIND2:TRAC:X:RLEV 0.0
	DISP:EVM:VIEW3:WIND2:TRAC:X:RLEV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–200
Max	200
Key Path	**SPAN/X Scale**

Ref Value (Symbol Power vs. Symbol Window)

Ref Value sets the reference value for the x-axis in the Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel <real>`
	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EVM:VIEW4:WIND2:TRAC:X:RLEV 0.0
	DISP:EVM:VIEW4:WIND2:TRAC:X:RLEV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	0.0
State Saved	Saved in instrument state.
Min	–200
Max	200
Key Path	**SPAN/X Scale**

Scale/Div

Sets the horizontal scale by changing a value per division. Scale/Div SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

Key Path	**SPAN X Scale**

Scale/Div (Symbol Error vs. Subcarrier Window)

Scale/Div sets the horizontal scale by changing a value per division in the Symbol Error vs. Subcarrier window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW3:WIND:TRAC:X:PDIV 84 DISP:EVM:VIEW3:WIND:TRAC:X:PDIV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	168.0
State Saved	Saved in instrument state.
Min	1.0
Max	500.0
Key Path	**SPAN/X Scale**

Scale/Div (Symbol Power vs. Subcarrier Window)

Scale/Div sets the horizontal scale by changing a value per division in the Symbol Power vs. Subcarrier window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW4:WIND:TRAC:X:PDIV 84 DISP:EVM:VIEW4:WIND:TRAC:X:PDIV?

Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	168.0
State Saved	Saved in instrument state.
Min	1.0
Max	500.0
Key Path	**SPAN/X Scale**

Scale/Div (Absolute Flatness/Differential Flatness Window)

Scale/Div sets the horizontal scale by changing a value per division in the Absolute Flatness and Differential Flatness windows of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW6:WIND:TRAC:X:PDIV 0.0 DISP:EVM:VIEW6:WIND:TRAC:X:PDIV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes Values of WIND[1] and WIND2 are ALWAYS coupled with each other.
Preset	0.0
State Saved	Saved in instrument state.
Min	–5000.0
Max	5000.0
Key Path	**SPAN/X Scale**

Scale/Div (Power vs Time Window)

Scale/Div sets the horizontal scale by changing a value per division in the Power vs. Time window of the Power vs. Time & Spectrum view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW7:WIND:TRACE:X:PDIVision 1ms DISP:EVM:VIEW7:WIND:TRACE:X:PDIVision?
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
Preset	84.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Key Path	**SPAN X Scale**

Scale/Div (Symbol Error vs. Symbol Window)

Scale/Div sets the horizontal scale by changing a value per division in the Symbol Error vs. Symbol window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW3:WIND2:TRAC:X:PDIV 0.0 DISP:EVM:VIEW3:WIND2:TRAC:X:PDIV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	2
State Saved	Saved in instrument state.
Min	1
Max	10
Key Path	**SPAN/X Scale**

Scale/Div (Symbol Power vs. Symbol Window)

Scale/Div sets the horizontal scale by changing a value per division in the Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EVM:VIEW4:WIND2:TRAC:X:PDIV 0.0 DISP:EVM:VIEW4:WIND2:TRAC:X:PDIV?
Restriction and Notes	If Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Dependencies/Couplings	See Restriction and Notes
Preset	2

State Saved	Saved in instrument state.
Min	1
Max	10
Key Path	**SPAN/X Scale**

Ref Position

Sets the reference position for the x-axis to the left, center, or right in the display of the window. Ref Position SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

Key Path	**SPAN X Scale**

Ref Position (Symbol Error vs. Subcarrier Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Symbol Error vs. Subcarrier window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVM:VIEW3:WIND:TRACE:X:RPOS LEFT DISP:EVM:VIEW3:WIND:TRACE:X:RPOS?
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Symbol Power vs. Subcarrier Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Symbol Power vs. Subcarrier window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVM:VIEW4:WIND:TRACE:X:RPOS LEFT DISP:EVM:VIEW4:WIND:TRACE:X:RPOS?
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Absolute Flatness/Differential Flatness Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Absolute Flatness and Differential Flatness windows of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVM:VIEW6:WIND2:TRACE:X:RPOS LEFT DISP:EVM:VIEW6:WIND2:TRACE:X:RPOS?
Dependencies/Couplings	Values of WIND[1] and WIND2 are ALWAYS coupled with each other.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Power vs Time Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Symbol Error vs. Subcarrier window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVM:VIEW7:WIND:TRACE:X:RPOS LEFT DISP:EVM:VIEW7:WIND:TRACE:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Symbol Error vs Symbol Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Symbol Error vs. Symbol window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EVM:VIEW3:WIND2:TRACE:X:RPOS LEFT DISP:EVM:VIEW3:WIND2:TRACE:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Ref Position (Symbol Power vs Symbol Window)

Ref Position sets the reference position for the x-axis to the left, center, or right in the display of the Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:RPOSition ?`
Example	DISP:EVM:VIEW4:WIND2:TRACE:X:RPOS LEFT DISP:EVM:VIEW4:WIND2:TRACE:X:RPOS?
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left | Ctr | Right
Key Path	**SPAN X Scale**

Auto Scaling

Toggles the Auto Scaling function between On and Off. Auto Scaling SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

Key Path	**SPAN X Scale**

Auto Scaling (Symbol Error vs. Subcarrier Window)

Toggles the Auto Scaling function between On and Off in the Symbol Error vs. Subcarrier window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW3:WIND:TRACE:X:COUP OFF DISP:EVM:VIEW3:WIND:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Key Path	**SPAN X Scale**

Auto Scaling (Symbol Power vs. Subcarrier Window)

Toggles the Auto Scaling function between On and Off in the Symbol Power vs. Subcarrier window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW4:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW4:WIND:TRACE:X:COUP OFF DISP:EVM:VIEW4:WIND:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

Auto Scaling (Absolute Flatness/Differential Flatness Window)

Toggles the Auto Scaling function between On and Off in the Absolute Flatness and Differential Flatness windows of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW6:WIND:TRACE:X:COUP OFF DISP:EVM:VIEW6:WIND:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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 Values of WIND[1] and WIND2 are ALWAYS coupled with each other.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

Auto Scaling (Power vs Time Window)

Toggles the Auto Scaling function between On and Off in the Power vs. Time window of the Power vs. Time & Spectrum view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW7:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW7:WIND:TRACE:X:COUP OFF DISP:EVM:VIEW7:WIND:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

Auto Scaling (Symbol Error vs Symbol Window)

Toggles the Auto Scaling function between On and Off in the Symbol Error vs. Symbol window of the Symbol Error view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW3:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW3:WIND2:TRACE:X:COUP OFF DISP:EVM:VIEW3:WIND2:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

Auto Scaling (Symbol Power vs Symbol Window)

Toggles the Auto Scaling function between On and Off in the Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EVM:VIEW4:WINDow2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EVM:VIEW4:WIND2:TRACE:X:COUP OFF DISP:EVM:VIEW4:WIND2:TRACE:X:COUP?
Restriction and Notes	When this parameter is set to On, pressing the front-panel Restart key, or the Restart softkey in the Meas Control menu, activates the scale coupling function, that automatically determines scale per division and reference values based on the measurement results. 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
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**SPAN X Scale**

Span

Allows you to modify the frequency span scale of the window. Unlike the complex spectrum measurement, This parameter only affects view scaling. The IF bandwidth for the FFT analysis is not affected by this parameter.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow2:FREQuency:SPAN <freq>`
	`:DISPlay:EVM:VIEW7:WINDow2:FREQuency:SPAN?`
Example	:DISP:EVM:VIEW7:WIND2:FREQ:SPAN 10Hz
	:DISP:EVM:VIEW7:WIND2:FREQ:SPAN?
Preset	10 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent:
	No Option = 10.0 MHz
	Option B25 = 25.0 MHz
Key Path	**SPAN X Scale**

AMPTD Y Scale

Accesses a menu of functions that allow you to set the vertical scale parameters.

Mode	WiMAX OFDMA
Key Path	**Front-panel key**

Ref Value

Accesses a menu that allows you to set vertical scale parameters. Ref Value SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

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Mode	WiMAX OFDMA
Key Path	AMPTD Y Scale

Ref Value (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window - Log)

Y Ref Value sets the reference value for the y-axis in the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows. The unit of value for the Y reference is set to dB when Scale Type (Log) is selected.

Mode	WiMAX OFDMA
Remote Command	:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1][:SCALe]:RLEVel <rel_ampl> :DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1][:SCALe]:RLEVel?
Example	:DISP:EVM:VIEW3:WIND:TRAC:Y:RLEV 20 :DISP:EVM:VIEW3:WIND:TRAC:Y:RLEV?
Restriction and Notes	When the Auto Scaling default is On, this value is automatically determined by the measurement result. Front panel access is available only when the Scale Type is LOG.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value. The value is switched according to Scale Type.
Preset	0

State Saved	Saved in instrument state.
Min	–500
Max	500
Key Path	**AMPTD Y Scale**

Ref Value (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window - Lin)

Y Ref Value sets the reference value for the y-axis in the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows. The unit of value for the Y reference is set to % when Scale Type (Lin) is selected.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y2[:SCALe]:RLEVel <real>` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y2[:SCALe]:RLEVel?`
Example	:DISP:EVM:VIEW3:WIND:TRAC:Y2:RLEV 20 :DISP:EVM:VIEW3:WIND:TRAC:Y2:RLEV?
Restriction and Notes	When the Auto Scaling default is On, this value is automatically determined by the measurement result. Front panel access is available only when the Scale Type is LIN.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value. The value is switched according to Scale Type.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	500
Key Path	**AMPTD Y Scale**

Ref Value (Absolute Flatness Window)

Y Ref Value sets the reference value for the y-axis in the Absolute Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <rel_ampl>` `:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EVM:VIEW6:WIND:TRAC:Y:RLEV 100 :DISP:EVM:VIEW6:WIND:TRAC:Y:RLEV?
Restriction and Notes	The default setting is 0.00 dBm. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value.
Preset	0.00 dB
State Saved	Saved in instrument state.
Min	–250 dB
Max	250 dB
Key Path	**AMPTD Y Scale**

Ref Value (Differential Flatness Window)

Y Ref Value sets the reference value for the y-axis in the Differential Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:RLEVel <rel_ampl>` `:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EVM:VIEW6:WIND2:TRAC:Y:RLEV 1.0 :DISP:EVM:VIEW6:WIND2:TRAC:Y:RLEV?

Restriction and Notes	The default setting is 0.00 dBm. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value.
Preset	0.00 dB
State Saved	Saved in instrument state.
Min	–20 dB
Max	20 dB
Key Path	**AMPTD Y Scale**

Ref Value (Power vs. Time/Power vs. Spectrum Window)

Y Ref Value sets the reference value for the y-axis in the Power vs. Time and Power vs. Spectrum windows of the Power vs. Time and Spectrum view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <ampl>` `:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EVM:VIEW7:WIND:TRAC:Y:RLEV 100 :DISP:EVM:VIEW7:WIND:TRAC:Y:RLEV?
Restriction and Notes	The default setting is 0.00 dBm. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250 dBm
Max	250 dBm
Key Path	**AMPTD Y Scale**

Ref Value (Symbol Power vs. Subcarrier/Symbol Power vs. Symbol Window)

Y Ref Value sets the reference value for the y-axis in the Symbol Power vs. subcarrier and Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <ampl>` `:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	:DISP:EVM:VIEW4:WIND:TRAC:Y:RLEV 100 :DISP:EVM:VIEW4:WIND:TRAC:Y:RLEV?
Restriction and Notes	The default setting is 0.00 dBm. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When Auto Scaling is set to On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling is set to Off. Attenuation is not coupled to Ref Value.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250 dBm
Max	250 dBm
Key Path	**AMPTD Y Scale**

Attenuation

Accesses a menu of functions that enable you to change attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, Attenuation in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale, Attenuation**

Scale/Div

Sets the logarithmic units per vertical graticule division in the display for the windows listed below, which are explained in greater detail in the following sections. When Auto Scaling is On, the Scale/Div is automatically determined by the measurement result. When you set a value manually, Auto Scaling is automatically toggled to Off. Scroll down to see all entries for this topic.

Key Path	**AMPTD Y Scale**

Scale/Div (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window - Log)

Sets the logarithmic units per vertical graticule division in the display for the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows. The unit of value for the Y reference is set to dB when Scale Type (Log) is selected.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1][:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1][:SCALe]:PDIVision?`
Example	:DISP:EVM:VIEW3:WIND:TRAC:Y:PDIV 10 :DISP:EVM:VIEW3:WIND:TRAC:Y:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result. Front panel access is available only when the Scale Type is LOG.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result. The value is switched according to Scale Type.
Preset	1
State Saved	Saved in instrument state.
Min	0.01 dB
Max	40 dB
Key Path	**AMPTD Y Scale**

Scale/Div (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window- Lin)

Sets the logarithmic units per vertical graticule division in the display for the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows. The unit of value for the Y reference is set to % when Scale Type (Lin) is selected.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y2[:SCALe]:PDIVision <real>` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y2[:SCALe]:PDIVision?`
Example	:DISP:EVM:VIEW3:WIND:TRAC:Y2:PDIV 10 :DISP:EVM:VIEW3:WIND:TRAC:Y2:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result. Front panel access is available only when the Scale Type is LIN.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result. The value is switched according to Scale Type.
Preset	1
State Saved	Saved in instrument state.
Min	0.01
Max	50
Key Path	**AMPTD Y Scale**

Scale/Div (Absolute Flatness Window)

Sets the logarithmic units per vertical graticule division in the display for the Absolute Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`

Example	:DISP:EVM:VIEW6:WIND:TRAC:Y:PDIV 10 :DISP:EVM:VIEW6:WIND:TRAC:Y:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result.
Preset	10 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	40 dB
Key Path	**AMPTD Y Scale**

Scale/Div (Differential Flatness Window)

Sets the logarithmic units per vertical graticule division in the display for the Differential Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	:DISP:EVM:VIEW6:WIND2:TRAC:Y:PDIV 10 :DISP:EVM:VIEW6:WIND2:TRAC:Y:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result.
Preset	10 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	40 dB

Key Path	**AMPTD Y Scale**

Scale/Div (Power vs. Time/Power vs. Spectrum Window)

Sets the logarithmic units per vertical graticule division in the display for the Power vs. Time and Power vs. Spectrum windows of the Power vs. Time and Spectrum view.

Mode	WiMAX OFDMA
Remote Command	:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?
Example	:DISP:EVM:VIEW7:WIND:TRAC:Y:PDIV 10 :DISP:EVM:VIEW7:WIND:TRAC:Y:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result.
Preset	10 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20 dB
Key Path	**AMPTD Y Scale**

Scale/Div (Symbol Power vs. Subcarrier/Symbol Power vs. Symbol Window)

Sets the logarithmic units per vertical graticule division in the display for the Symbol Power vs. subcarrier and Symbol Power vs. Symbol window of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?

Example	:DISP:EVM:VIEW4:WIND:TRAC:Y:PDIV 10 :DISP:EVM:VIEW4:WIND:TRAC:Y:PDIV?
Restriction and Notes	The default setting is 10.00 dB. However, since the Auto Scaling default is On, this value is automatically determined by the measurement result.
Dependencies/Couplings	When you set a value manually, Auto Scaling automatically changes to Off. When Auto Scaling is set to On, this value is automatically determined by the measurement result.
Preset	10 dB
State Saved	Saved in instrument state.
Min	0.10 dB
Max	20 dB
Key Path	**AMPTD Y Scale**

Presel Center

Optimizes the preselector settings for the current measurement.

See AMPTD Y Scale, Presel Center in the “Analyzer Setup Functions” section for more information.

Key Path	**AMPTD Y Scale**

Presel Adjust

Allows you to adjust the preselector settings for the current measurement.

See AMPTD Y Scale, Presel Adjust in the “Analyzer Setup Functions” section for more information.

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

Sets the reference position of the y-axis to the top, center, or bottom in the display of the following view windows, which are explained in greater detail in the following sections. Note that changing the reference position does not affect the reference level value.

Key Path	**AMPTD Y Scale**

Ref Position (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window)

Ref Position sets the reference position of the y-axis to the top, center, or bottom in the display of the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1]|2[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1]|2[:SCALe]:RPOSition?`
Example	:DISP:EVM:VIEW3:WIND2:TRAC:Y:RPOS CENT :DISP:EVM:VIEW3:WIND2:TRAC:Y:RPOS?
Preset	Y[1] : TOP Y2 : BOTTom
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale**

Ref Position (Absolute Flatness Window)

Ref Position sets the reference position of the y-axis to the top, center, or bottom in the display of the Absolute Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA

Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EVM:VIEW6:WINDow[1]:TRACe:Y[:SCALe]:RPOSition ?`
Example	:DISP:EVM:VIEW6:WIND:TRAC:Y:RPOS CENT
	:DISP:EVM:VIEW6:WIND:TRAC:Y:RPOS?
Preset	TOP
State Saved	Saved in instrument state.
Range	Top I Ctr I Bot
Key Path	**AMPTD Y Scale**

Ref Position (Differential Flatness Window)

Ref Position sets the reference position of the y-axis to the top, center, or bottom in the display of the Differential Flatness window of the Spectral Flatness view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:EVM:VIEW6:WINDow2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EVM:VIEW6:WIND2:TRAC:Y:RPOS CENT
	:DISP:EVM:VIEW6:WIND2:TRAC:Y:RPOS?
Preset	CENTer
State Saved	Saved in instrument state.
Range	Top I Ctr I Bot
Key Path	**AMPTD Y Scale**

Ref Position (Power vs. Time/Power vs. Spectrum Window)

Ref Position sets the reference position of the y-axis to the top, center, or bottom in the display of the Power vs. Time and Power vs. Spectrum windows of the Power vs. Time and Spectrum view.

Mode	WiMAX OFDMA

Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EVM:VIEW7:WIND2:TRAC:Y:RPOS CENT :DISP:EVM:VIEW7:WIND2:TRAC:Y:RPOS?
Preset	TOP
State Saved	Saved in instrument state.
Range	Top | Ctr | Bot
Key Path	**AMPTD Y Scale**

Ref Position (Symbol Power vs. Subcarrier/Symbol Power vs. Symbol Window)

Ref Position sets the reference position of the y-axis to the top, center, or bottom in the display of the Symbol Power vs. subcarrier and Symbol Power vs. Symbol windows of the Symbol Power view.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	:DISP:EVM:VIEW4:WIND2:TRAC:Y:RPOS CENT :DISP:EVM:VIEW4:WIND2: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 in the windows listed below, which are explained in greater detail in the following sections. Upon pressing the Restart front-panel key or Restart softkey in the Meas Control menu, the Auto Scaling function automatically determines the scale per division and reference values based on the measurement results.

Key Path	**AMPTD Y Scale**

Auto Scaling (Symbol Error vs. Subcarrier/Symbol Error vs. Symbol Window)

Auto Scaling toggles the Auto Scaling function between On and Off in the Symbol Error vs. Subcarrier and Symbol Error vs. Symbol windows.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1]|2[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[1]|2[:SCALe]:COUPle?`
Example	:DISP:EVM:VIEW3:WIND2:TRAC:Y:COUP 0 :DISP:EVM:VIEW3:WIND2:TRAC:Y:COUP?
Dependencies/Couplings	When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. When this value is set to On, Ref Value and Scale/Div are automatically determined by the measurement result.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

Auto Scaling (Absolute Flatness/Differential Flatness Window)

Auto Scaling toggles the Auto Scaling function between On and Off in the Absolute Flatness and Differential Flatness windows.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EVM:VIEW6:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EVM:VIEW6:WIND2:TRAC:Y:COUP 0 :DISP:EVM:VIEW6:WIND2:TRAC:Y:COUP?
Dependencies/Couplings	When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. When this value is set to On, Ref Value and Scale/Div are automatically determined by the measurement result.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

Auto Scaling (Power vs. Time/Power vs. Spectrum Window)

Auto Scaling toggles the Auto Scaling function between On and Off in the Power v. Time and Power vs. Spectrum windows.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EVM:VIEW7:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EVM:VIEW7:WIND2:TRAC:Y:COUP 0 :DISP:EVM:VIEW7:WIND2:TRAC:Y:COUP?
Dependencies/Couplings	When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. When this value is set to On, Ref Value and Scale/Div are automatically determined by the measurement result.
Preset	ON
State Saved	Saved in instrument state.

Range	On | Off
Key Path	**AMPTD Y Scale**

Auto Scaling (Symbol Power vs. Subcarrier/Symbol Power vs. Symbol Window)

Auto Scaling toggles the Auto Scaling function between On and Off in the Symbol Power vs. Subcarrier and Symbol Power vs. Symbol windows.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EVM:VIEW4:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	:DISP:EVM:VIEW4:WIND2:TRAC:Y:COUP 0 :DISP:EVM:VIEW4:WIND2:TRAC:Y:COUP?
Dependencies/Couplings	When you set a value to either Scale/Div or Ref Value manually, Auto Scaling automatically changes to Off. When this value is set to On, Ref Value and Scale/Div are automatically determined by the measurement result.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**AMPTD Y Scale**

Scale Type

Chooses a linear or logarithmic vertical scale for the display and for remote data readout. This parameter is only valid for Symbol Error vs Subcarrier and Symbol Error vs Symbol view window.

When Scale Type (Log) is selected, the vertical graticule divisions are scaled in logarithmic unit, i.e., dB.

When Scale Type (Lin) is selected, the vertical graticule divisions are linearly scaled in the unit of %. Unlike the SA, Scale/Div is still available in Scale Type.

Note that there is no Y Axis Unit parameter in this view because this view has only one unit for each Scale Type, for example % for linear, and dB for logarithmic.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic` `:DISPlay:EVM:VIEW3:WINDow[1]|2:TRACe:Y[:SCALe]:SPACing?`
Example	DISP:EVM:WIND:TRAC:Y:SPAC LOG DISP:EVM:WIND:TRAC:Y:SPAC?
Preset	LIN
State Saved	Saved in instrument state.
Range	Log|Lin
Key Path	**AMPTD Y Scale**

View/Display

Accesses a menu that allows you to select from the following measurement view and display settings. Auto Scaling SCPI commands vary depending on the active window. Scroll down to see all entries for this topic.

- POLar(1): I/Q Measured Polar Constellation - Provides a combination view of an I/Q Symbol Constellation graph and the summary data.
- MAP(2): Zone & Data Burst Info – Provides a combination view of a Zone list table, the selected map graph, and the Data Burst list table.
- SERRor(3): Symbol Error (Quad View) – Provides a combination view of a Symbol Error vs. Subcarrier graph, Symbol Error vs. Symbol graph, I/Q Symbol Constellation graph, and Zone Definition Map graph.
- SPOWer(4): Symbol Power (Quad View) – Provides a combination view of a Symbol Power vs. Subcarrier graph, Symbol Power vs. Symbol graph, IQ Measured Constellation, and Zone Definition Map graph.
- SUMMary(5): Peak/Average Metrics – Provides a table of the summary for the measurement result and information at the selected burst.
- FLATness(6): Spectral Flatness – Provides a combination view of a Spectral Flatness graph and a Differential Spectral Flatness graph, and summary data.
- PVT(7): Power vs Time & Spectrum – Provides a combination view of a Power vs Time graph and a Power vs. Spectrum graph.

The following SCPI command allows you to select the desired measurement view by keyword. (SCPI only)

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW[:SELect] POLar|ZMAP|SERRor|SPOWer|SUMMary|FLATness|PVT` `:DISPlay:EVM:VIEW[:SELect]?`
Example	DISP:EVM:VIEW:SEL PVT DISP:EVM:VIEW:SEL?
Dependencies/Couplings	:DISP:EVM:VIEW[:SEL] and :DISP:EVM:VIEW:NSEL shall be synchronized with each other.
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Measured Polar Constln | Zone/Data Burst Info | Symbol Error (Quad View) | Symbol Power(Quad View) | Peak/Average Metrics | Spectrum Flatness | Power vs Time & Spectrum
Key Path	**View/Display**

The following SCPI command allows you to select the desired measurement view by number

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW:NSELect <integer>` `:DISPlay:EVM:VIEW:NSELect?`
Example	DISP:EVM:VIEW:NSEL 1 DISP:EVM:VIEW:NSEL?
Dependencies/Couplings	:DISP:EVM:VIEW[:SEL] and :DISP:EVM:VIEW:NSEL shall be synchronized with each other.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	7

I/Q Measured Polar Constln

Provides a combination view of an I/Q Symbol Constellation graph and the summary data.

Key Path	**View/Display**

Zone & Data Burst Info

Provides a combination view of a Zone list table, the selected map graph, and the Data Burst list table.

Key Path	**View/Display**

Symbol Error (Quad View)

Provides a combination view of a Symbol Error vs. Subcarrier graph, Symbol Error vs. Symbol graph, I/Q Symbol Constellation graph, and Zone Definition Map graph.

Key Path	**View/Display**

Symbol Power (Quad View)

Provides a combination view of a Symbol Power vs. Subcarrier graph, Symbol Power vs. Symbol graph, IQ Measured Constellation, and Zone Definition Map graph.

Key Path:	**View/Display**

Results Summary - Peak/Average Metrics

Provides a table of the summary for the measurement result and information at the selected burst.

Key Path	**View/Display**

Spectral Flatness

Provides a combination view of a Spectral Flatness graph and a Differential Spectral Flatness graph, and summary data.

Key Path	**View/Display**

Power vs Time & Spectrum

Provides a combination view of a Power vs Time graph and a Power vs. Spectrum graph.

Key Path	**View/Display**

Display

Accesses the menu that allows you to set parameters that affect the display. All measurements have identical Display menu functionality for each key in the Display menu..

Key Path	**View/Display**

Annotation

Turns the screen annotation to On or Off for all windows. Note that softkey annotation will remain in the display. Since this functionality is mode global, see Mode functionality section for details.

Key Path	**View/Display**

Graticule

Allows you to set display graticules On and Off. Since this functionality is mode global, see Mode functionality section for details.

Key Path	**View/Display**

Title

Invokes the Title menu that contains Change Title and Clear Title functions.

Key Path	**View/Display**

Change Title

Allows you to modify the title. The SCPI command and Preset/Default value are defined according to the current measurement.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:ANNotation:TITLe:DATA <string>`
	`:DISPlay:EVM:ANNotation:TITLe:DATA?`

Example	DISP:EVM:ANN:TITL:DATA “Agilent”
	DISP:EVM:ANN:TITL:DATA?
Preset	Modulation Analysis
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Clear Title

Allows you to clear a title from the front-panel display. Once cleared, the title cannot be retrieved.

Mode	WiMAX OFDMA
Key Path	**View/Display, Display, Title**

View Settings

OBW Line

Allows you to display OBW values and range.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:OBW ON|OFF|0|1`
	`:DISPlay:EVM:VIEW4:WINDow2:TRACe:OBW?`
Example	:DISP:EVM:VIEW4:WIND2:TRAC:OBW ON
	:DISP:EVM:VIEW4:WIND2:TRAC:OBW?
Preset	OFF
State Saved	Saved in instrument state.
Key Path	**View/Display, Power vs Time and Spectrum**

Inactive subchans in EVM

Lets you include the inactive subchannels in the EVM traces (this only applies to Data Burst Analysis mode). This parameter does not affect the EVM calculation. If this parameter is set to “Include”, the EVM results will include the EVM value of the unmodulated subchannels, and I/Q Meas will include the unmodulated subcarriers’ constellation.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:SUBChannel:INACtive INCLude|EXCLude` `:DISPlay:EVM:SUBChannel:INACtive?`
Example	:DISP:EVM:SUBC:INAC INCL
Preset	EXCLude
State Saved	Saved in instrument state.
Range	INCLude|EXCLude
Key Path	**View/Display, I/Q Measured Polar ContIn**

Burst Trace (SCPI only)

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:TRACe:LIST:BURSt[:STATe] 1|0|ON|OFF, …` `:DISPlay:EVM:TRACe:LIST:BURSt[:STATe]?`
Example	:DISP:EVM:TRAC:LIST:BURS ON, ON, ON :DISP:EVM:TRAC:LIST:BURS?
Restriction and Notes	Number of elements is determined by Number of Bursts provided by :CALC:EVM:BURS:COUN?.
Preset	ON, ON
State Saved	Saved in instrument state.

BW

Accesses parameters that affect bandwidth.

Key Path	**BW**

Info BW

Activates the **Info BW** active function, which allows you to manually set the information bandwidth (Info BW) of the analyzer.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:EVM:BANDwidth[:RESolution] <bandwidth>` `[:SENSe]:EVM:BANDwidth[:RESolution]?`
Example	EVM:BAND 1 KHZ EVM:BAND?
Preset	10 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: No Option = 10 MHz Option B25 = 25 MHz
Key Path	**BW**

Meas Setup

Accesses menus that allow you to set measurement setup parameters.

Key Path	**Meas Setup**

Avg/Hold Num

Set the number of data acquisitions that will be averaged. After the specified number of average counts, the averaging mode setting determines the averaging action.

Mode	WiMAX OFDMA

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

Example	:EVM:AVER:COUN 100 :EVM:AVER:COUN? :EVM:AVER OFF :EVM:AVER?
Remote Command Notes	.
Preset	10 ON
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.

KEY Exponential averaging SCPI EXPonential	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.
KEY Repeat averaging SCPI REPeat	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	WiMAX OFDMA
Remote Command	`[:SENSe]:EVM:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:EVM:AVERage:TCONtrol?`
Example	:EVM:AVER:TCON EXP :EVM:AVER:TCON?
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp | Repeat
Key Path	**Meas Setup**

Capture Interval

Sets the data capture length in frames that will be used in the acquisition. If Average is set to On, all capture data are analyzed and their results are averaged until the average number count is reached.

Mode	WiMAX OFDMA
Remote Command	`[:SENSe]:EVM:CAPTure:TIME[:FRAMe] <integer>` `[:SENSe]:EVM:CAPTure:TIME[:FRAMe]?`

Example	EVM:CAPT:TIME 1 EVM:CAPT:TIME?
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	1
Key Path	**Meas Setup**

Meas Offset

Sets the timing offset of the capture interval in frames. If the Capture Interval is 1 frame, Meas Offset is fixed at “0”. If Average is set to On, the frame that is analyzed does not take into account this offset value during averaging. After this measurement is complete, changing the offset value will result in running post-processing to analyze the offset frame; the measurement results are then updted.(only for non-averaged results).

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:SWEep:OFFSet <integer>` `:CALCulate:EVM:SWEep:OFFSet?`
Example	CALC:EVM:SWE:OFFS 0 CALC:EVM:SWE:OFFS?
Dependencies/Couplings	Max value is limited by Capture Interval.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	Capture Interval – 1
Key Path	**Meas Setup**

Limits

Accesses measurement setup limit parameters.

Key Path	**Meas Setup**

RMS RCE

Accesses RMS RCE measurement setup limit parameters.

Key Path	**Meas Setup, Limits**

Limits Sets the limit state for the RMS EVM measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE:STATe OFF|ON|0|1` `:CALCulate:EVM:LIMit[1]|2:RRCE:STATe?`
Example	CALC:EVM:LIM:RRCE:STAT ON CALC:EVM:LIM:RRCE:STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, Limits, RMS RCE**

Composite Sets the limit for RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:RRCE?`
	`:CALCulate:EVM:LIMit[1]|2:RRCE:AUTO 0|1|OFF|ON`
	`:CALCulate:EVM:LIMit[1]|2:RRCE:AUTO?`

Example	:CALC:EVM:LIM:RRCE –50 :CALC:EVM:LIM:RRCE? :CALC:EVM:LIM:RRCE:AUTO 0 :CALC:EVM:LIM:RRCE:AUTO?
Dependencies/Couplings	Mode: Auto The actual limit value depends on the modulation type when single burst was focused. The limit value is selected by the detected modulation type automatically. If composite burst was focused, the manual limit value is used. Mode: Manual The Limit value is used for single or composite burst types.
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0.00 1
State Saved	Saved in instrument state.
Min	–100
Max	0.00
Key Path	**Meas Setup, Limits, RMS RCE**

QPSK–1/2 Sets the limit of the QPSK coding rate 1/2 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE:QPSK:R1B2 <rel_ampl>` `:CALCulate:EVM:LIMit[1]|2:RRCE:QPSK:R1B2?`
Example	CALC:EVM:LIM:RRCE:QPSK:R1B2 –10.0 CALC:EVM:LIM:RRCE:?

Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–15
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Key Path	**Meas Setup, Limits, RMS RCE**

QPSK–3/4 Sets the limit of the QPSK coding rate 3/4 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE:QPSK:R3B4 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:RRCE:QPSK:R3B4?`
Example	CALC:EVM:LIM:RRCE:QPSK:R3B4 –10.0
	CALC:EVM:LIM:RRCE:QPSK:R3B4?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–18
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Key Path	**Meas Setup, Limits, RMS RCE**

16QAM–1/2 Sets the limit of the 16QAM coding rate 1/2 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE:QA16:R1B2 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:RRCE:QA16:R1B2?`
Example	CALC:EVM:LIM:RRCE:QA16:R1B2 –10.0
	CALC:EVM:LIM:RRCE:QA16:R1B2?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.

Preset	–20.5
State Saved	Saved in instrument state.
Min	–100.00
Max	0
Key Path	**Meas Setup, Limits, RMS RCE**

16QAM–3/4 Sets the limit of the 16QAM coding rate 3/4 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:RRCE:QA16:R3B4 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:RRCE:QA16:R3B4?`
Example	CALC:EVM:LIM:RRCE:QA16:R3B4 –10.0
	CALC:EVM:LIM:RRCE:QA16:R3B4?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–24.0
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Key Path	**Meas Setup, Limits, RMS RCE**

64QAM–1/2 Sets the limit of the 64QAM coding rate 1/2 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R1B2 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R1B2?`
Example	CALC:EVM:LIM:RRCE:QA64:R1B2 –10.0
	CALC:EVM:LIM:RRCE:QA64:R1B2?
Preset	–15
State Saved	Saved in instrument state.
Min	–100.00
Max	0.00

Key Path	**Meas Setup, Limits, RMS RCE**

64QAM–2/3 Sets the limit of the 64QAM coding rate 2/3 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R2B3 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R2B3?`
Example	CALC:EVM:LIM:RRCE:QA64:R2B3 –10.0
	CALC:EVM:LIM:RRCE:QA64:R2B3?
Preset	–18
State Saved	Saved in instrument state.
Min	–100.00
Max	0.00
Key Path	**Meas Setup, Limits, RMS RCE**

64QAM–3/4 Sets the limit of the 64QAM coding rate 3/4 burst for the RMS RCE measurement pass/fail test.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R3B4 <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]:RRCE:QA64:R3B4?`
Example	CALC:EVM:LIM:RRCE:QA64:R3B4 –10.0
	CALC:EVM:LIM:RRCE:QA64:R3B4?
Preset	–18
State Saved	Saved in instrument state.
Min	–100.00
Max	0.00
Key Path	**Meas Setup, Limits, RMS RCE**

Peak RCE

Sets the limit for the Peak RCE measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:PRCE <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:PRCE?`
	`:CALCulate:EVM:LIMit[1]|2:PRCE:STATe OFF|ON|0|1`
	`:CALCulate:EVM:LIMit[1]|2:PRCE:STATe?`

Example	:CALC:EVM:LIM:PRCE –50 :CALC:EVM:LIM:PRCE? :CALC:EVM:LIM:PRCE:STAT ON :CALC:EVM:LIM:PRCE:STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0.00 OFF
State Saved	Saved in instrument state.
Min	–100
Max	0.00
Key Path	**Meas Setup, Limits**

Pilot RCE

Sets the limit for the Pilot RCE measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:RCEPilot <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:RCEPilot?`
	`:CALCulate:EVM:LIMit[1]|2:RCEPilot:STATe OFF|ON|0|1`
	`:CALCulate:EVM:LIMit[1]|2:RCEPilot:STATe?`

Example	:CALC:EVM:LIM:RCEP –50 :CALC:EVM:LIM:RCEP? :CALC:EVM:LIM:RCEP:STAT ON :CALC:EVM:LIM:RCEP:STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.

Preset	0.00 OFF
State Saved	Saved in instrument state.
Min	–100
Max	0.00
Key Path	**Meas Setup, Limits**

Frequency Error

Sets the limit in ppm for the absolute Frequency Error measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:FERRor <freq>`
	`:CALCulate:EVM:LIMit[1]|2:FERRor?`
	`:CALCulate:EVM:LIMit[1]|2:FERRor:STATe OFF|ON|0|1`
	`:CALCulate:EVM:LIMit[1]|2:FERRor:STATe?`

Example	:CALC:EVM:LIM:FERR –50 :CALC:EVM:LIM:FERR? :CALC:EVM:LIM:FERR:STAT ON :CALC:EVM:LIM:FERR:STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	8.00 ON
State Saved	Saved in instrument state.
Min	0
Max	1000
Key Path	**Meas Setup, Limits**

Time Offset

Sets the limit for the Time Offset measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:TOFFset <time>`
	`:CALCulate:EVM:LIMit[1]|2:TOFFset?`
	`:CALCulate:EVM:LIMit[1]|2:TOFF:STATe OFF|ON|0|1`
	`:CALCulate:EVM:LIMit[1]|2:TOFF:STATe?`
Example	:CALC:EVM:LIM:TOFF 100
	:CALC:EVM:LIM:TOFF?
	:CALC:EVM:LIM:TOFF:STAT ON
	:CALC:EVM:LIM:TOFF:STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0.00
	OFF
State Saved	Saved in instrument state.
Min	–1.0e6
Max	1.0e6
Key Path	**Meas Setup, Limits**

Abs Spectral Flatness

Accesses menu that allows you to set absolute spectral flatness measurement setup parameters.

Key Path	**Meas Setup, Limits**

Offset Selects the offset pairs (upper and lower) that the softkeys affect, and displays the memory selection menu from A to F. The memory selection menu allows you to store up to 5 sets of limit values for the offset pairs, such as Start Subcarrier/ Stop Subcarrier, Upper Mask Start/Upper Mask Stop, and Lower Mask Start/Lower. Press Offset until the letter of the desired offset (A, B, C, D, E, or F) is underlined. Only one selection at a time is shown on this softkey label.

Mode	WiMAX OFDMA
Preset	A
Range	A I B I C I D I E I F
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

Start Subcarrier Specifies the start subcarrier for the currently selected offset.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SUBCarrier:STARt <integer>, <integer>, <integer>, <integer>, <integer>, <integer>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SUBCarrier:STARt?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SUBCarrier:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SUBCarrier:STATe?`

Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STAR 0, 1, 210, 0, 0, 0 :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STAR? :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STAT ON, ON, ON, OFF, OFF, OFF :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STAT?
Restriction and Notes	

Dependencies/Couplings	Coupled to Stop Subcarrier. Start cannot go above the stop subcarrier. Similarly Stop Subcarrier cannot go below the Start Subcarrier. Affected by Radio Device, FFT Size (See the Mode Setup section), and the permutation type of the selected zone as follows: Downlink FFT 2048, PUSC : 0, 1, 420, 0, 0, 0 Downlink FFT 1024, PUSC (default): 0, 1, 210, 0, 0, 0 Downlink FFT 512, PUSC : 0, 1, 105, 0, 0, 0 Downlink FFT 128, PUSC : 0, 1, 21, 0, 0, 0 Downlink FFT 2048, FUSC : 0, 1, 426, 0, 0, 0 Downlink FFT 1024, FUSC : 0, 1, 213, 0, 0, 0 Downlink FFT 512, FUSC : 0, 1, 107, 0, 0, 0 Downlink FFT 128, FUSC : 0, 1, 26, 0, 0, 0 Downlink FFT 2048, OFUSC : 0, 1, 432, 0, 0, 0 Downlink FFT 1024, OFUSC : 0, 1, 216, 0, 0, 0 Downlink FFT 512, OFUSC : 0, 1, 108, 0, 0, 0 Downlink FFT 128, OFUSC : 0, 1, 27, 0, 0, 0 Downlink FFT 2048, AMC : 0, 1, 432, 0, 0, 0 Downlink FFT 1024, AMC : 0, 1, 216, 0, 0, 0 Downlink FFT 512, AMC : 0, 1, 108, 0, 0, 0 Downlink FFT 128, AMC : 0, 1, 27, 0, 0, 0 Uplink FFT 2048, PUSC : 0, 1, 420, 0, 0, 0 Uplink FFT 1024, PUSC (default): 0, 1, 210, 0, 0, 0 Uplink FFT 512, PUSC : 0, 1, 102, 0, 0, 0 Uplink FFT 128, PUSC : 0, 1, 24, 0, 0, 0 Uplink FFT 2048, OPUSC : 0, 1, 432, 0, 0, 0 Uplink FFT 1024, OPUSC : 0, 1, 216, 0, 0, 0 Uplink FFT 512, OPUSC : 0, 1, 108, 0, 0, 0 Uplink FFT 128, OPUSC : 0, 1, 27, 0, 0, 0
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0, 1, 210, 0, 0, 0 | 0, 1, 210, 0, 0, 0 ON, ON, ON, OFF, OFF, OFF | ON, ON, ON, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–1024
Max	1024
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

Stop Subcarrier Allows you to specify the stop subcarrier for the currently selected offset.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:SUBCarrier:STOP <integer>, <integer>, <integer>, <integer>, <integer>, <integer>,` `:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:SUBCarrier:STOP?`
Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STOP 0, 210, 420, 0, 0, 0 :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SUBC:STOP ?
Restriction and Notes	
Dependencies/Couplings	Coupled to Stop Subcarrier. Start cannot go above the stop subcarrier. Similarly Stop Subcarrier cannot go below the Start Subcarrier. Affected by Radio Device, FFT Size (See the Mode Setup section), and the permutation type of the selected zone as follows: Downlink FFT 2048, PUSC : 0, 420, 840, 0, 0, 0 Downlink FFT 1024, PUSC (default): 0, 210, 420, 0, 0, 0 Downlink FFT 512, PUSC : 0, 105, 210, 0, 0, 0 Downlink FFT 128, PUSC : 0, 21, 42, 0, 0, 0 Downlink FFT 2048, FUSC : 0, 426, 851, 0, 0, 0 Downlink FFT 1024, FUSC : 0, 213, 425, 0, 0, 0 Downlink FFT 512, FUSC : 0, 107, 213, 0, 0, 0 Downlink FFT 128, FUSC : 0, 26, 53, 0, 0, 0 Downlink FFT 2048, OFUSC : 0, 432, 864, 0, 0, 0 Downlink FFT 1024, OFUSC : 0, 216, 432, 0, 0, 0 Downlink FFT 512, OFUSC : 0, 108, 216, 0, 0, 0 Downlink FFT 128, OFUSC : 0, 27, 54, 0, 0, 0 Downlink FFT 2048, AMC : 0, 432, 864, 0, 0, 0 Downlink FFT 1024, AMC : 0, 216, 432, 0, 0, 0 Downlink FFT 512, AMC : 0, 108, 216, 0, 0, 0 Downlink FFT 128, AMC : 0, 27, 54, 0, 0, 0 Uplink FFT 2048, PUSC : 0, 420, 840, 0, 0, 0 Uplink FFT 1024, PUSC (default): 0, 210, 420, 0, 0, 0 Uplink FFT 512, PUSC : 0, 102, 205, 0, 0, 0 Uplink FFT 128, PUSC : 0, 24, 48, 0, 0, 0 Uplink FFT 2048, OPUSC : 0, 432, 864, 0, 0, 0 Uplink FFT 1024, OPUSC : 0, 216, 432, 0, 0, 0 Uplink FFT 512, OPUSC : 0, 108, 216, 0, 0, 0 Uplink FFT 128, OPUSC : 0, 27, 54, 0, 0, 0

Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0, 210, 420, 0, 0, 0 | 0, 210, 420, 0, 0, 0
State Saved	Saved in instrument state.
Min	–1024
Max	1024
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

Offset Side Specifies which offset side will be measured.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SIDE BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive` `:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:SIDE?`
Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SIDE BOTH, BOTH, BOTH, BOTH, BOTH, BOTH :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:SIDE?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH | BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Neg | Both | Pos
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

UpperMaskStart Sets the upper limit level at the start subcarrier for the selected offset.

Mode — WiMAX OFDMA

Remote Command

```
:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS
:OFFSet:LIST:UPPer:STARt
<real>,<real>,<real>,<real><real><real>
```

```
:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS
:OFFSet:LIST:UPPer:STARt?
```

```
:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS
:OFFSet:LIST:UPPer:STATe ON|OFF|1|0, ON|OFF|1|0,
ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0
```

```
:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS
:OFFSet:LIST:UPPer:STATe?
```

Example

:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STAR |–15.00, 2.00, 2.00, 0.00, 0.00, 0.00

:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STAR?

:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STATe 0, 0, 0, 0, 0, 0

:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STATe?

Restriction and Notes

Dependencies/Couplings — Coupled to Upper Mask Stop if coupling is set to “Auto”. That is, Start is made the same as stop.

Remote Command Notes — Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.

Preset — –15.00, 2.00, 2.00, 0.00, 0.00, 0.00|–15.00, 2.00, 2.00, 0.00, 0.00, 0.00

ON, ON, ON, OFF, OFF, OFF| ON, ON, ON, OFF, OFF, OFF

State Saved — Saved in instrument state.

Min — –100 dB

Max — 100 dB

Key Path — **Meas Setup, Limits, Abs Spectral Flatness**

UpperMaskStop Sets the upper mask limit at the stop subcarrier for the selected offset. The upper mask limit ranges from –100 to +100 dB. You can also toggle this function between Auto and Man settings. If set to Auto, the **Upper Mask Stop** power level limit is coupled to **Upper Mask Start, and** results in a flat limit line. If set to Man, Upper Mask Start and Upper Mask Stop take different values and result in a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:UPPer:STOP <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:UPPer:STOP?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:UPPer:STOP:AUTO 0|1|OFF|ON, 0|1|OFF|ON, 0|1|OFF|ON, 0|1|OFF|ON, 0|1|OFF|ON, 0|1|OFF|ON`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:UPPer:STOP:AUTO?`

Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STOP –15.00, 2.00, 2.00, 0.00, 0.00, 0.00 :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STOP? :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STOP:AUTO ON, ON, ON, ON, ON, ON :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:UPP:STOP:AUTO?
Restriction and Notes	
Dependencies/Couplings	Coupled to Upper Mask Start if coupling is set to “Auto”. That is, Start is made the same as stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–15.00, 2.00, 2.00, 0.00, 0.00, 0.00 | –15.00, 2.00, 2.00, 0.00, 0.00, 0.00 ON, ON, ON, ON, ON, ON | ON, ON, ON, ON, ON, ON
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

LowerMaskStart Sets the upper limit level at the start subcarrier for the selected offset.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:LOWer:STARt <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:LOWer:STARt?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:LOWer:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS:OFFSet:LIST:LOWer:STATe?`

Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STAR –999.00, –2.00, –2.00, –999.00, –999.00, –999.00 :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STAR? :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STATe OFF, ON, ON, OFF, OFF, OFF :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STATe?
Restriction and Notes	
Dependencies/Couplings	Coupled to Lower Mask Stop if coupling is set to “Auto”; that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–999.00, –2.00, –2.00, –999.00, –999.00, –999.00 | –999.00, –2.00, –2.00, –999.00, –999.00, –999.00 OFF, ON, ON, OFF, OFF, OFF | OFF, ON, ON, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

LowerMaskStop Sets the lower mask limit at the stop subcarrier for the selected offset. The upper mask limit ranges from –100 to +100 dB. You can also toggle this function between Auto and Man settings. If set to Auto, the **Upper Mask Stop** power level limit is coupled to **Upper Mask Start, which** results in a flat limit line. If set to Man, Upper Mask Start and Upper Mask Stop take different values and result in a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:LOWer:STOP <real>, <real>, <real>, <real>, <real>, <real>`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:LOWer:STOP?`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:LOWer:STOP:AUTO 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:ABS :OFFSet:LIST:LOWer:STOP:AUTO?`

Example	:CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STOP –999.00, –2.00, –2.00, –999.00, –999.00, –999.00 :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STOP? :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STOP: AUTO ON,ON,ON,ON,ON,ON :CALC:EVM:LIM:SPEC:AMPF:ABS:OFFS:LIST:LOW:STOP: AUTO?
Restriction and Notes	
Dependencies/Couplings	Coupled to Upper Mask Start if coupling is set to Auto; that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–999.00, –2.00, –2.00, –999.00, –999.00, –999.00 | –999.00, –2.00, –2.00, –999.00, –999.00, –999.00 ON,ON,ON,ON,ON,ON | ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Abs Spectral Flatness**

Diff Spectral Flatness

Accesses menu that allows you to set differential spectral flatness measurement setup parameters.

Key Path	**Meas Setup, Limits**

Offset Selects the offset pairs (upper and lower) that the selected softkeys will affect, and displays the memory selection menu from A to F. The memory selection menu allows you to store up to 5 sets of limit values for the offset pairs, such as Start Subcarrier, Stop Subcarrier, Upper Mask Start, Upper Mask Stop, Lower Mask Start, Lower Mask Stop and Offset Side. Press Offset until the letter of the desired offset (A, B, C, D, E, or F) is underlined. Only one selection at a time is shown on this softkey label.

Mode	WiMAX OFDMA
Preset	A
Range	A I B I C I D I E I F
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

Start Subcarrier Specifies the start subcarrier for the currently selected offset.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STARt <integer>, <integer>, <integer>, <integer>, <integer>, <integer>`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STARt?`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STATe?`

Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STAR 0, 1, 0, 0, 0, 0 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STAR? :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STAT ON, ON, OFF, OFF, OFF, OFF :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STAT?
Restriction and Notes	
Dependencies/Couplings	Coupled to Stop Subcarrier. Start cannot go above the Stop subcarrier. Similarly Stop Subcarrier cannot go below the Start Subcarrier. Affected by Radio Device, FFT Size (See the Mode Setup section), and the permutation type of the selected zone as follows: Downlink FFT 2048, PUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 1024, PUSC (default): 0, 1, 0, 0, 0, 0 Downlink FFT 512, PUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 128, PUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 2048, FUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 1024, FUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 512, FUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 128, FUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 2048, OFUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 1024, OFUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 512, OFUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 128, OFUSC : 0, 1, 0, 0, 0, 0 Downlink FFT 2048, AMC : 0, 1, 0, 0, 0, 0 Downlink FFT 1024, AMC : 0, 1, 0, 0, 0, 0 Downlink FFT 512, AMC : 0, 1, 0, 0, 0, 0 Downlink FFT 128, AMC : 0, 1, 0, 0, 0, 0 Uplink FFT 2048, PUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 1024, PUSC (default): 0, 1, 0, 0, 0, 0 Uplink FFT 512, PUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 128, PUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 2048, OPUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 1024, OPUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 512, OPUSC : 0, 1, 0, 0, 0, 0 Uplink FFT 128, OPUSC : 0, 1, 0, 0, 0, 0
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0, 1, 0, 0, 0, 0 | 0, 1, 0, 0, 0, 0 ON, ON, OFF, OFF, OFF, OFF | ON, ON, OFF, OFF, OFF, OFF

State Saved	Saved in instrument state.
Min	–1024
Max	1024
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

Stop Subcarrier Allows you to specify the stop subcarrier for the currently selected offset.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STOP <integer>, <integer>, <integer>, <integer>, <integer>, <integer>` `:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SUBCarrier:STOP?`
Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STOP 0, 420, 0, 0, 0, 0 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SUBC:STOP?
Restriction and Notes	

Dependencies/Couplings	Coupled to Stop Subcarrier. Start cannot go above the stop subcarrier. Similarly Stop Subcarrier cannot go below the Start Subcarrier. Affected by Radio Device, FFT Size (See the Mode Setup section), and the permutation type of the selected zone as follows: Downlink FFT 2048, PUSC : 0, 840, 0, 0, 0, 0 Downlink FFT 1024, PUSC (default): 0, 420, 0, 0, 0, 0 Downlink FFT 512, PUSC : 0, 210, 0, 0, 0, 0 Downlink FFT 128, PUSC : 0, 42, 0, 0, 0, 0 Downlink FFT 2048, FUSC : 0, 851, 0, 0, 0, 0 Downlink FFT 1024, FUSC : 0, 425, 0, 0, 0, 0 Downlink FFT 512, FUSC : 0, 213, 0, 0, 0, 0 Downlink FFT 128, FUSC : 0, 53, 0, 0, 0, 0 Downlink FFT 2048, OFUSC : 0, 864, 0, 0, 0, 0 Downlink FFT 1024, OFUSC : 0, 432, 0, 0, 0, 0 Downlink FFT 512, OFUSC : 0, 216, 0, 0, 0, 0 Downlink FFT 128, OFUSC : 0, 54, 0, 0, 0, 0 Downlink FFT 2048, AMC : 0, 864, 0, 0, 0, 0 Downlink FFT 1024, AMC : 0, 432, 0, 0, 0, 0 Downlink FFT 512, AMC : 0, 216, 0, 0, 0, 0 Downlink FFT 128, AMC : 0, 54, 0, 0, 0, 0 Uplink FFT 2048, PUSC : 0, 840, 0, 0, 0, 0 Uplink FFT 1024, PUSC (default): 0, 420, 0, 0, 0, 0 Uplink FFT 512, PUSC : 0, 205, 0, 0, 0, 0 Uplink FFT 128, PUSC : 0, 48, 0, 0, 0, 0 Uplink FFT 2048, OPUSC : 0, 864, 0, 0, 0, 0 Uplink FFT 1024, OPUSC : 0, 432, 0, 0, 0, 0 Uplink FFT 512, OPUSC : 0, 216, 0, 0, 0, 0 Uplink FFT 128, OPUSC : 0, 54, 0, 0, 0, 0
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0, 420, 0, 0, 0, 0 | 0, 420, 0, 0, 0, 0
State Saved	Saved in instrument state.
Min	–1024
Max	1024
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

Offset Side Specifies which offset side will be measured.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SIDE BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive, BOTH|NEGative|POSitive` `:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:SIDE?`
Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SIDE BOTH, BOTH, BOTH, BOTH, BOTH, BOTH :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:SIDE?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH|BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Neg|Both|Pos
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

Upper Mask Start Sets the upper limit level at the start subcarrier for the selected offset.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STARt <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STARt?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STATe?`

Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAR 0.1, 0.1, 0.00, 0.00, 0.00, 0.00 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAR ? :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAT ON, ON, ON, OFF, OFF, OFF :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAT?
Restriction and Notes	
Dependencies/Couplings	Coupled to Upper Mask Stop if coupling is set to “Auto”; that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0.1, 0.1, 0.00, 0.00, 0.00, 0.00 | 0.1, 0.1, 0.00, 0.00, 0.00, 0.00 ON, ON, ON, OFF, OFF, OFF | ON, ON, ON, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

Upper Mask Stop Sets the upper mask limit at the stop subcarrier for the selected offset. The upper mask limit ranges from –100 to +100 dB. You can also toggle this function between Auto and Man settings. If set to Auto, the **Upper Mask Stop** power level limit is coupled to **Upper Mask Start, which** results in a flat limit line. If set to Man, Upper Mask Start and Upper Mask Stop take different values and result in a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STOP <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STOP?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STOP:AUTO 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:UPPer:STOP:AUTO?`

Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS2:LIST:UPP:STOP 0.1, 0.1, 0.00, 0.00, 0.00, 0.00 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS2:LIST:UPP:STOP? :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP:AUTO ON,ON,ON,ON,ON,ON :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP:AUTO?
Restriction and Notes	
Dependencies/Couplings	Coupled to Upper Mask Start if coupling is set to Auto; that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	0.1, 0.1, 0.00, 0.00, 0.00, 0.00 | 0.1, 0.1, 0.00, 0.00, 0.00, 0.00 ON,ON,ON,ON,ON,ON | ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

LowerMaskStart Sets the lower limit level at the start subcarrier for the selected offset.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:LOWer:STARt <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:LOWer:STARt?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:LOWer:STATe ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0, ON|OFF|1|0`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF:OFFSet:LIST:LOWer:STATe?`

Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAR –0.1, –0.1, 0.00, 0.00, 0.00, 0.00 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAR ? :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAT ON, ON, OFF, OFF, OFF, OFF :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STAT?
Restriction and Notes	
Dependencies/Couplings	Coupled to Lower Mask Stop if coupling is set to “Auto”; that is, Start is made the same as Stop.
Remote Command Notes	Comma separated list of 6 values. LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–0.1, –0.1, 0.00, 0.00, 0.00, 0.00 | –0.1, –0.1, 0.00, 0.00, 0.00, 0.00 ON, ON, OFF, OFF, OFF, OFF | ON, ON, OFF, OFF, OFF, OFF
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

LowerMaskStop Sets the lower mask limit at the stop subcarrier for the selected offset. The lower mask limit ranges from –100 to +100 dB. You can also toggle this function between Auto and Man settings. If set to Auto, the **Lower Mask Stop** power level limit is coupled to **Lower Mask Start, which** results in a flat limit line. If set to Man, Lower Mask Start and Lower Mask Stop take different values and result in a sloped limit line.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF :OFFSet:LIST:LOWer:STOP <real>, <real>, <real>, <real>, <real>, <real>`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF :OFFSet:LIST:LOWer:STOP?`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF :OFFSet:LIST:LOWer:STOP:AUTO 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF, 0|1|ON|OFF`
	`:CALCulate:EVM:LIMit[1]|2:SPECtrum:AMPFlatness:DIFF :OFFSet:LIST:LOWer:STOP:AUTO?`

Example	:CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP –0.1, –0.1, 0.00, 0.00, 0.00, 0.00 :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP ? :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP: AUTO ON,ON,ON,ON,ON,ON :CALC:EVM:LIM:SPEC:AMPF:DIFF:OFFS:LIST:UPP:STOP: AUTO?
Restriction and Notes	
Dependencies/Couplings	Coupled to Lower Mask Start if coupling is set to Auto; that is, Start is made the same as Stop.
Preset	–0.1, –0.1, 0.00, 0.00, 0.00, 0.00 | –0.1, –0.1, 0.00, 0.00, 0.00, 0.00 ON,ON,ON,ON,ON,ON | ON,ON,ON,ON,ON,ON
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Key Path	**Meas Setup, Limits, Diff Spectral Flatness**

I/Q Offset

Sets the limit state for the I/Q Offset measurement pass/fail test.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:LIMit[1]|2:IQOFfset <rel_ampl>`
	`:CALCulate:EVM:LIMit[1]|2:IQOFfset?`
	`:CALCulate:EVM:LIMit[1]|2:IQOFfset:STATe OFF|ON|0|1`
	`:CALCulate:EVM:LIMit[1]|2:IQOFfset:STATe?`

Example	:CALC:EVM:LIM1:IQOF 0 :CALC:EVM:LIM1:IQOF? :CALC:EVM:LIM:IQOF STAT OFF :CALC:EVM:LIM:IQOF STAT?
Remote Command Notes	LIMit1 is for BS, 2 for MS. Default is BS.
Preset	–15 dB ON
State Saved	Saved in instrument state.
Min	–100
Max	0
Key Path	**Meas Setup, Limits**

Spec Flatness Meas Interval

Selects the Measurement Interval to calculate the average power for each subcarrier.

Remote Command	`:CALCulate:EVM:SPECtrum:AMPFlatness:INTerval PAMBle|ALL` `:CALCulate:EVM:SPECtrum:AMPFlatness:INTerval?`
Preset	ALL
State Saved	Saved in instrument state.
Range	Preamble | All
Key Path	**Meas Setup**

Zone/Data Burst Map

Selects the Zone Definition which defines the zone information.

Remote Command	`:CALCulate:EVM:MAP:SELect:TYPE AUTO|CUSTom`
	`:CALCulate:EVM:MAP:SELect:TYPE?`
Preset	AUTO
State Saved	Saved in instrument state.
Range	Auto Detect Map | Custom Map
Key Path	**Meas Setup**

Auto Detect Map

Selects the coding type of the forward error correction that is used to decode the DL-MAP burst.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MAP:SELect:FECCode CC|CTC`
Example	:CALC:EVM:MAP:SEL:FECC CC
	:CALC:EVM:MAP:SEL:FECC?
Preset	CC
State Saved	Saved in instrument state.
Range	CC (Convolutional Code) | CTC (Conv Turbo Code)
Key Path	**Meas Setup, Zone Data Burst Map**

Custom Map

Accesses settings that enable you to name a map.

Key Path	**Meas Setup, Zone/Data Burst Map**

Change Map Name Sets the customized Map name.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MAP:CUSTom:NAME <string>`
	`:CALCulate:EVM:MAP:CUSTom:NAME?`

Example	:CALC:EVM:MAP:CUST:NAME “Agilent”
	:CALC:EVM:MAP:CUST:NAME?
Restriction and Notes	The maximum length of the string is 15 characters.
Preset	Imported file name
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**Meas Setup, Zone Data Burst Map, Custom Map**

Auto Detect Now

Detects Map information automatically using DL-MAP/UL-MAP and DCD/UCD.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MAP:DETect`
Example	:CALC:EVM:MAP:DET
Restriction and Notes	This key is not available (key is grayed out) when Custom Map is selected.
Key Path	**Meas Setup, Zone Data Burst Map**

Zone Num

Selects the zone definition to be used.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:ZONE <integer>`
	`:CALCulate:EVM:ZONE?`
Example	:CALC:EVM:ZONE 1
Remote Command Notes	.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	determined by current map
Key Path	**Meas Setup**

Data Burst Analysis

Selects a method of burst analysis. You can choose between the burst map method or the single burst method.

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Remote Command	`:CALCulate:EVM:BURSt:TYPE[:SELect] MAP|SINGle|UZONe`
	`:CALCulate:EVM:BURSt:TYPE[:SELect]?`
Preset	MAP
State Saved	Saved in instrument state.
Range	Burst Map | Single Burst (Manual) | Uniform Zone (Manual)
Key Path	**Meas Setup**

Burst Map

Analyzes a frame according to the defined map information.

Key Path	**Meas Setup, Data Burst Analysis**

Use Defined Boosting Level Selects whether to automatically set boosting levels, or to use the values that are specified for the bursts.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt:POWer:MAP ON|OFF|1|0`
	`:CALCulate:EVM:BURSt:POWer:MAP?`
Preset	OFF
State Saved	Saved in instrument state.
Key Path	**Meas Setup, Burst Analysis, Burst Map**

Single Burst

Accesses single burst parameters.

Key Path	**Meas Setup, Data Burst Analysis**

Subchan Offset Set the number of the Subchannel logical offset for the burst region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt[1]|2:SUBChannel:OFFSet <integer>` `:CALCulate:EVM:BURSt[1]|2:SUBChannal:OFFSet?`
Example	:CALC:EVM:BURS:SEL:SUBC:OFFS 1 :CALC:EVM:BURS:SEL:SUBC:OFFS?
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	Number of subchannels on current zone – 1
Key Path	**Meas Setup, Burst Analysis, SIngle Burst**

Subchannel Intvl Set the number of the subchannel logical interval for the burst region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt[1]|2:SUBChannel:INTerval <integer>` `:CALCulate:EVM:BURSt[1]|2:SUBChannal:INTerval?`
Example	:CALC:EVM:BURS:SEL:SUBC:INT 1 :CALC:EVM:BURS:SEL:SUBC:INT?
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of subchannels on current zone – Burst Region Subchannel Offset
Key Path	**Meas Setup, Burst Analysis, Single Burst**

Symbol Offset Set the number of the OFDMA symbol offset for the burst region.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt[1]|2:SYMBol:OFFSet <integer>` `:CALCulate:EVM:BURSt[1]|2:SYMBol:OFFSet?`
Example	:CALC:EVM:BURS:SEL:SYMB:OFFS 1 :CALC:EVM:BURS:SEL:SYMB:OFFS?
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	0
State Saved	Saved in instrument state.
Min	1
Max	14
Key Path	**Meas Setup, Burst Analysis, Single Burst**

Symbol Intvl Set the number of the OFDMA symbol interval for the burst position.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt[1]|2:SYMBol:INTerval <integer>` `:CALCulate:EVM:BURSt[1]|2:SYMBol:INTerval?`
Example	:CALC:EVM:BURS:SEL:SYMB:INT 1 :CALC:EVM:BURS:SEL:SYMB:INT?
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	15 – Burst Region Symbol Offset
Key Path	**Meas Setup, Burst Analysis, Single Burst**

Burst Shape Selects between wrapped or rectangle burst shapes.

Remote Command	`:CALCulate:EVM:BURSt[1]|2:SHAPe WRAPped|RECTangle`
	`:CALCulate:EVM:BURSt[1]|2:SHAPe?`
Example	CALC:EVM:BURS:SHAP WRAP
	CALC:EVM:BURS:SHAP?
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	RECTangle
State Saved	Saved in instrument state.
Range	WRAPped | RECTangle
Key Path	**Meas Setup, Burst Analysis, Single Burst**

Data Mod Type Selects the Data Modulation Type to be used.

Remote Command	`:CALCulate:EVM:BURSt[1]|2:MODulation:TYPE QPSKR1BY2|QPSKR3BY4|QAM16R1BY2|QAM16R3BY4|QAM64R1BY2|QAM64R2BY3|QAM64R3BY4`
	`:CALCulate:EVM:BURSt[1]|2:MODulation:TYPE?`
Example	CALC:EVM:BURS:MOD:TYPE QPSKR1BY2
	CALC:EVM:BURS:MOD:TYPE?
Restriction and Notes	64QAM parameters (QAM64R1BY2, QAM64R2BY3, and QAM64R3BY4) are available only for BS mode.
Remote Command Notes	BURSt1 is for BS, 2 for MS. Default is BS.
Preset	QPSKR1BY2
State Saved	Saved in instrument state.
Range	QPSK–1/2 | QPSK–3/4 | 16QAM–1/2 | 16QAM–3/4 | 64QAM–1/2 | 64QAM–2/3 | 64QAM–3/4
Key Path	**Meas Setup, Burst Analysis, Single Burst**

Uniform Zone

Defines a single burst as a Uniform Zone.

Key Path	**Meas Setup, Data Burst Analysis**

Data Mod Type

Selects the Data Modulation Type to be used.

Remote Command	`:CALCulate:EVM:UZONe[1]|2:MODulation:TYPE QPSKR1BY2|QPSKR3BY4|QAM16R1BY2|QAM16R3BY4|QAM64R1BY2|QAM64R2BY3|QAM64R3BY4` `:CALCulate:EVM:UZONe [1]|2:MODulation:TYPE?`
Restriction and Notes	64QAM parameters (QAM64R1BY2, QAM64R2BY3, and QAM64R3BY4) are available only for BS mode.
Remote Command Notes	UZONe1 is for BS, 2 for MS. Default is BS.
Preset	QPSKR1BY2
State Saved	Saved in instrument state.
Range	QPSK–1/2 | QPSK–3/4 | 16QAM–1/2 | 16QAM–3/4 | 64QAM–1/2 | 64QAM–2/3 | 64QAM–3/4
Key Path	**Meas Setup, Burst Analysis, Uniform Zone**

Zone Offset

Allows you to set the Zone Offset in symbols.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:ZONE:OFFSet <integer>`
	`:CALCulate:EVM:ZONE:OFFSet?`
	`:CALCulate:EVM:ZONE:OFFSet:AUTO 0|1|OFF|ON`
	`:CALCulate:EVM:ZONE:OFFSet:AUTO?`
Example	:CALC:EVM:ZONE:OFFS 2
	:CALC:EVM:ZONE:OFFS?
	:CALC:EVM:ZONE:OFFSet:AUTO ON
	:CALC:EVM:ZONE:OFFSet:AUTO?
Restriction and Notes	It is grayed out when Burst Map is selected in Burst Analysis.
Dependencies/Couplings	When you set a value to Zone Offset or Zone Interval manually, both Zone Offset Auto and Zone Interval Auto automatically change to Man.
	Zone Offset Auto and Zone Interval Auto are always coupled to each other.
	Zone Offset automatically changes to Auto (On) when Burst Map is selected in Burst Analysis.
Preset	1
	ON
State Saved	Saved in instrument state.
Min	0
Max	determined by current map
Key Path	**Meas Setup**

Zone Interval

Allows you to set Zone Interval in symbols.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:ZONE:INTerval <integer>`
	`:CALCulate:EVM:ZONE:INTerval?`
	`:CALCulate:EVM:ZONE:INTerval:AUTO 0|1|OFF|ON`
	`:CALCulate:EVM:ZONE:INTerval:AUTO?`

Example	:CALC:EVM:ZONE:INT 12 :CALC:EVM:ZONE:INT? :CALC:EVM:ZONE:INT:AUTO 0 :CALC:EVM:ZONE:INT:AUTO?
Restriction and Notes	It is grayed out when Burst Map is selected in Burst Analysis.
Dependencies/Couplings	When you set a value to Zone Offset or Zone Interval manually, both Zone Offset Auto and Zone Interval Auto automatically change to Man. Zone Offset Auto and Zone Interval Auto are always couple to each other. Zone Interval automatically changes to Auto (On) when Burst Map is selected in Burst Analysis.
Preset	12 ON
State Saved	Saved in instrument state.
Min	0
Max	determined by current map
Key Path	**Meas Setup**

Data Burst Select

The analyzer allows single or multiple burst analysis. To select all data burst for analysis, press 'All On' key. To select a single data burst for analysis, press 'Single' key on a selected Data Burst Num. To select multiple data bursts for analysis, turn on a selected Data Burst Num.

Mode	WiMAX OFDMA
Remote Command	`:DISPlay:EVM:TRACe:LIST:BURSt [:STATe]1|0|ON|OFF,...`
	`:DISPlay:EVM:TRACe:LIST:BURSt [:STATe]?`
Example	`:DISPlay:EVM:TRAC:LIST:BURS?`
	`:DISPlay:EVM:TRAC:LIST:BURS ON, ON, ON`
Restrictions and Notes	Number of elements is determined by Number of Bursts provided by :CALC:EVM:BURS:COUN?,
Preset	ON
State Saved	Yes
Key Path	**Meas Setup, Data Burst Select**

Data Burst Num

Allows you to select multiple data bursts for analysis when it is set to On.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt:STATe ON|OFF|1|0,`
	`:CALCulate:EVM:BURSt:STATe?`
Example	:CALCulate:EVM:BURSt:STATe 0, …
	:CALCulate:EVM:BURSt:STATe?
Restriction and Notes	Notes: Number of elements is determined by Number of Bursts provided by :CALC:EVM:BURS:COUN?
Preset	1
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, Data Burst Select**

All On

Allows you to select all data burst for analysis.

Mode	WiMAX OFDMA
Restriction and Notes	Number of elements is determined by Number of Bursts provided by :CALC:EVM:BURS:COUN?.
Key Path	**Meas Setup, Data Burst Select**

Single

Allows you to select a single data burst for analysis.

Mode	WiMAX OFDMA
Restriction and Notes	Number of elements is determined by Number of Bursts provided by :CALC:EVM:BURS:COUN?.
Key Path	**Meas Setup, Data Burst Select**

Preamble Index

Sets the number that the Preamble Index specifies for the preamble sequence of the downlink subframe.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:PINDex <integer>` `:CALCulate:EVM:PINDex?`
Example	EVM:PIND 1 EVM:PIND?
Restriction and Notes	This parameter is available only in BS mode.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	113
Key Path	**Meas Setup**

Subchannel Group Bitmask

Specifies which subchannel groups are allocated to the segment. The DL PUSC zone definition provides 6 subchannel groups which specify the number of used subchannels and how they are mapped to subcarriers for analysis of DL-PUSC data bursts.

Remote Command	`:CALCulate:EVM:SUBChannel:MASK OFF|ON|0|1, …` `:CALCulate:EVM:SUBChannel:MASK?`
Restriction and Notes	This parameter is available only in BS mode.
Preset	1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0
Max	1
Key Path	**Meas Setup**

Preamble Index Auto Search

When pressing this key, the measurement automatically starts to search for the preamble that leads the burst. The result of the search affects the Preamble Index.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:DETect:PAMBle`
Example	:CALC:EVM:DET:PAMB
Dependencies/Couplings	This immediate action might change the parameter Preamble Index (:CALCulate:EVM:PINDex)
Key Path	**Meas Setup**

UL Permbase

Sets the Uplink Permbase number for MS measurement. This parameter is needed to determine subcarrier allocation.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MS:PBASe <integer>` `:CALCulate:EVM:MS:PBASe?`
Example	EVM:MS:PBAS 1 EVM:MS:PBAS?
Restriction and Notes	This parameter is available only in MS mode.
Preset	0
State Saved	Saved in instrument state.
Min	0
Max	69
Key Path	**Meas Setup**

Meas Preset

Restores all the measurement parameters to their default values.

Mode	WiMAX OFDMA
Remote Command	`:CONFigure:EVM`
Example	CONF:EVM
Key Path	**Meas Setup**

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Key Path	**Meas Setup**

Pilot in RMS/Pk RCE

Lets you include the Pilot in RCE calculations.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:PILot INCLude	EXCLude`
	`:CALCulate:EVM:PILot?`
Example	:CALC:EVM:PIL INCL
Preset	EXCLude
State Saved	Saved in instrument state.
Range	INCLude|EXCLude
Key Path	**Meas Setup, Advanced**

Spectrum

Sets a spectrum to either normal or to inverted for demodulation related measurements. If set to INVert, the upper and lower spectrums are swapped.

The invert function conjugates the spectrum, which is equivalent to taking the negative of the quadrature component in demodulation. The correct setting (Normal or Invert) depends on whether the signal at the input of the instrument has a high or a low side mix.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:SPECtrum INVert|NORMal`
	`:CALCulate:EVM:SPECtrum?`
Example	:CALC:EVM:SPEC INV
	:CALC:EVM:SPEC?
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Invert
Key Path	**Meas Setup, Advanced**

Symbol Timing Adjust

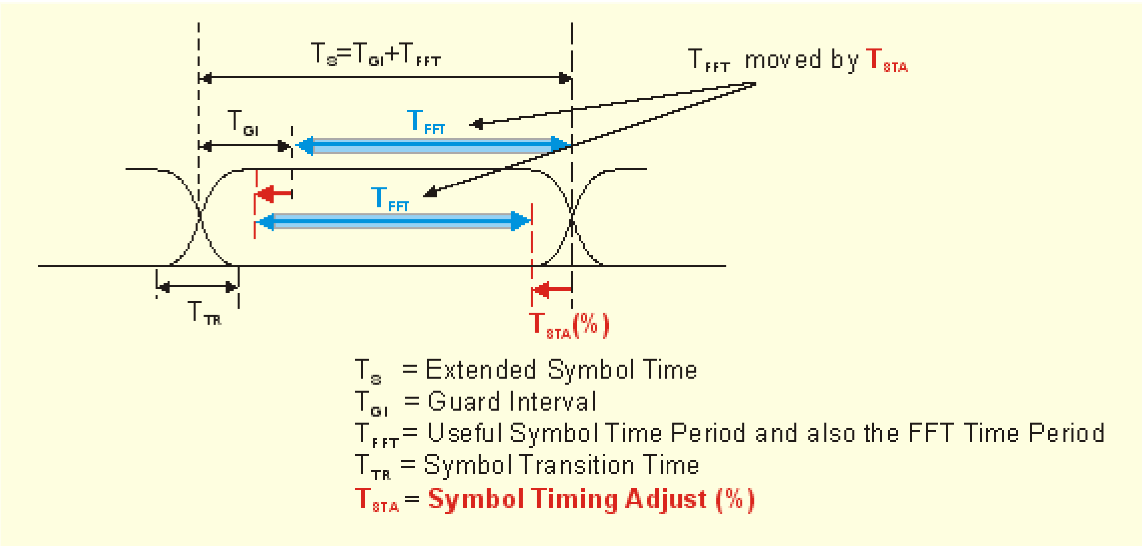
Symbol Timing Adjust allows you to adjust the "useful symbol time period" (TFFT) within the "OFDMA extended symbol time period" (TS). Symbol Timing Adjust shifts the start of the TFFT period to earlier in the TS time period. You specify the amount of TFFT shift as a percentage of the TFFT length.

The extended OFDMA symbol time period (TS) consists of a guard interval (TGI) plus a "useful symbol time period" (T

FFT). Within the TS, the analyzer performs the demodulation and data analysis on only one TFFT time period. The Symbol Time Adjust parameter allows you to move the TFFT within the TS.

Typically, the TGI time period is ignored and only the TFFT time period is used. The Symbol Time Adjust parameter causes the demodulation start time to begin earlier within each extended symbol time. The minimum Symbol Time Adjust value is equal to "-(guard interval)/100", the maximum value is "0" (full guard interval).

The Symbol Time Adjust parameter is reset to the default value whenever the Guard Interval is changed. The default value is –3.125%, if the guard interval is 1/16 or greater. The default value is equal to TGI*100/2 (half the guard interval) when the guard interval is less than 1/16.



OFDMA Symbol Time Structure

Remote Command	`:CALCulate:EVM:SYMBol:ADJust <real>`
	`:CALCulate:EVM:SYMBol:ADJust?`
Example	:CALC:EVM:SYMB:ADJ –3.125
	:CALC:EVM:SYMB:ADJ?
Preset	–3.125%

State Saved	Saved in instrument state.
Range	–12.5 % to – 0 %
Key Path	**Meas Setup, Advanced**

Pilot Tracking

802.16 OFDMA performs demodulation relative to the data in pilot carriers embedded in the signal. These pilot carriers replace data-carrying elements of the signal and allow some kinds of impairments to be removed or "tracked out".

Many impairments will be common to all pilot carriers and can be measured and displayed as "common pilot error".

In addition, several specific tracking functions can be individually switched on and off in the demodulation performed by this measurement. This is a very useful troubleshooting approach, since modulation errors can be examined with and without the benefit of particular types of pilot tracking.

Key Path	**Meas Setup, Advanced**

Track Amplitude Track Amplitude specifies whether the analyzer tracks amplitude changes in the pilot subcarriers. When Track Amplitude is selected, the analyzer applies pilot subcarrier amplitude error correction to the pilot and data subcarriers. This is in addition to Track Phase and Track Timing error correction, if selected.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:PILot:TRACk:AMPLitude OFF|ON|0|1`
	`:CALCulate:EVM:PILot:TRACk:AMPLitude?`
Example	:CALC:EVM:PIL:TRAC:AMPL 1
	:CALC:EVM:PIL:TRAC:AMPL?
Preset	OFF
State Saved	Saved in instrument state.
Range	On ǀ Off
Key Path	**Meas Setup, Advanced, Pilot Tracking**

Track Phase The Track Phase parameter specifies whether the analyzer tracks phase changes in the pilot subcarriers. When Track Phase is selected, the analyzer applies pilot subcarrier phase error correction to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Timing error correction if selected.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:PILot:TRACk:PHASe OFF|ON|0|1`
	`:CALCulate:EVM:PILot:TRACk:PHASe?`
Example	:CALC:EVM:PIL:TRAC:PHA 0
	:CALC:EVM:PIL:TRAC:PHA?
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup, Advanced, Pilot Tracking**

Track Timing The Track Timing parameter specifies whether the analyzer tracks timing changes in the pilot subcarriers. When Track Timing is selected the analyzer applies pilot subcarrier timing error correction (frequency offset correction) to the pilot and data subcarriers. This is in addition to Track Amplitude and Track Phase error correction if selected.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:PILot:TRACk:TIMing OFF|ON|0|1`
	`:CALCulate:EVM:PILot:TRACk:TIMing?`
Example	:CALC:EVM:PIL:TRAC:TIM 1
	:CALC:EVM:PIL:TRAC:TIM?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Meas Setup Advanced, Pilot Tracking**

Equalizer Training

When demodulating the 802.16 OFDMA signal, the analyzer uses an equalizer to correct for linear impairments in the signal path, such as multi-path. The analyzer supports three different methods to initialize, or "train", the equalizer: Chan Estimation Seq Only, Chan Estimation Seq & Data and Chan Estimation Seq & Pilots. Selecting an appropriate method can help isolate problems that contribute to increased RCE (EVM).

Remote Command	`:CALCulate:EVM:EQUalizer:TMODe SEQuence | SDATa | SPILot` `:CALCulate:EVM:EQUalizer:TMODe?`
Preset	SEQuence
State Saved	Saved in instrument state.
Range	SEQuence | SDATa | SPILot
Key Path	**Meas Setup, Advanced**

Trigger

Accesses menu that allows you to set triggering parameters.

Key Path	**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	WiMAX OFDMA
Remote Command	`:TRIGger:EVM[:SEQuence]:SOURce EXTernal[1]|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF` `:TRIGger:EVM[:SEQuence]:SOURce?`
Example	TRIG:EVM:SEQ:SOUR IMM TRIG:EVM:SEQ:SOUR?
Preset	IMMediate
State Saved	Saved in instrument state.
Range	Free Run (Immediate) | Video (IF Envlp) | Line | External 1 | External 2 | RF Burst (Wideband) | Periodic Timer
Key Path	**Trigger**

Auto Trig

Toggles the auto trigger feature between On and Off. See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Trigger**

Trig Hold Off

Toggles the trigger hold off feature between On and Off. See Triggers in the "Measurement Functions" section for more information on trigger settings.

Key Path	**Trigger. More**

Sweep/Control

Accesses settings that affect the sweep viewed in the display.

Key Path	**Sweep/Control**

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.

Key Path	**Sweep/Control**

Marker

Accesses marker and trace parameters.

Key Path	**Marker**

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	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	:CALC:EVM:MARK:MODE POS :CALC:EVM: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 set to Off. Active Function Display: - the marker Chip value in the IQ Measured Polar graph - the marker X axis value in any other graph The value entered in the active function area will display the marker value to its full entered precision.
Remote Command Notes	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 (SCPI 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**.

This command is not valid when Marker Trace is 'POLar'(I/Q Polar),and Marker Chip Value is supported instead.

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:EVM: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 "Invalid suffix" error will be generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number (NAN).
Preset	After a preset, all markers are set to Off, so a Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37.

Marker X Axis Position (SCPI 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	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:EVM: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**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is **Off** the response is not a number (NAN).
Remote Command Notes	This command is not available when Marker Trace of the selected marker (:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?) is set to POLar. In this case, this command is ignored.
Preset	After a preset, all markers are set to 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

Marker Y Axis Value (SCPI only)

Sets the marker Y Axis value in the current marker Y Axis unit.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	:CALC:EVM:MARK11:Y?
Restriction and Notes	If no suffix is sent it will use the current Y Axis unit. If a suffix is sent that does not have units of absolute amplitude, an “Invalid suffix” error will be generated. The query returns the marker Y-axis result if the control mode is **Normal**or **Delta**. If the marker is **Off** the response is not a number (NAN) If Marker Trace selects ‘Symbol Traces’ the return values are subcarrier index, symbol number, normalized I/Q and RMS RCE results.
Preset	Result dependant on Markers setup and signal source
State Saved	No

Properties

Key Path	**Marker**

Select Marker

Key Path	**Marker**

Relative To

Selects the marker that the selected marker will be relative to - its reference marker.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	:CALC:EVM: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 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 I 3 I 4 I 5 I 6 I 7 I 8 I 9 I 10 I 11 I 12 I 1
State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Marker, Properties**

Marker Trace

Accesses a menu that allows you to assign a specified marker to the designated trace.

Symbol Traces means that three traces for I/Q polar, Symbol Error Carrier, Symbol Error Symbol, Symbol Power Carrier, and Symbol Power Symbol can be assigned. If used, a marker pointer is placed on each trace. In this case, the three pointers will move at the same time, as coupled markers, whenever the X position of the Symbol Traces changes.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe SYMBol|EVCarrier|RECarrier|EVSymbol|RESymbol|PCARrier|RPCarrier|PSYMbol|RPSymbol|FLATness|DFLatness|PVT|SPECtrum` `:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	:CALC:EVM:MARK:TRACE?
Preset	SYMB
State Saved	Saved in instrument state.
Range	Symbol Traces | Error Vector Carrier | RMS Error Vector Carrier | Error Vector Symbol | RMS Error Vector Symbol | Symbol Power Carrier | RMS_@Symbol Power Carrier | Symbol Power Symbol | RMS Symbol Power_@Symbol | PvT | Spectrum |
Key Path	**Marker**

Couple Markers

When this function is active, moving any marker causes an “equal X Axis movement” of every other marker that is not set to **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 offscreen.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EVM:MARKer:COUPle[:STATe]?`
Example	:CALC:EVM:MARK:COUP ON
Restriction and Notes	When the marker is assigned to IQ Measured Polar graph, not X Axis value, but Chip value is coupled instead.

Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Marker**

All Markers Off

Turns all markers off.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer:AOFF`
Example	:CALC:EVM:MARK:AOFF
Key Path	**Marker**

Peak Search

Accesses menus that allow you to set peak search parameters.

Key Path	**Front-panel key**

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`:CALC:EVM:MARK2:MAX`
Key Path	**Peak Search**

Next Peak

Moves the selected marker to the peak that has the next highest amplitude that is less than the marker's current value.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	:CALC:EVM:MARK2:MAX:NEXT
Key Path	**Peak Search**

Next Pk Right

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

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:RIGHt`
Example	:CALC:EVM:MARK2:MAX:RIGH
Key Path	**Peak Search**

Next Pk Left

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

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:LEFT`
Example	:CALC:EVM:MARK2:MAX:LEFT
Key Path	**Peak Search**

Marker Delta

Performs the same function as the Delta 1-of-N selection key in the Marker menu. This sets the control mode for the selected marker to Delta mode. The softkey allows you to conveniently perform a peak search and change the marker’s control mode to Delta without having to access two separate menus.

Key Path	**Peak Search**

Continuous Peak Search

Sets Continuous Peak Search to On or Off. When Continuous Peak Search is set to On, a peak search is automatically performed for the selected marker after each sweep. The rules for finding the peak are exactly the same as for **Peak Search**, including the peak criteria rules. If no valid peak is found, the “No Peak Found” warning is generated after each sweep. If a valid peak is found, the message “Peak Found” is displayed after each sweep.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe] ON|OFF|1|0` `:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:CPEak[:STATe]?`
Example	:CALC:EVM:MARK:CPE ON
Preset	OFF
State Saved	Saved in instrument state.
Range	Off|On
Key Path	**Peak Search**

Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if in zero span) differences between the highest and lowest y-axis value.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:PTPeak`
Example	:CALC:EVM:MARK:PTP
Restriction and Notes	Turns on the Marker Δ active function.
Dependencies/Couplings	This key is not available (key is grayed out) when **Coupled Markers** is on.
Key Path	**Peak Search**

Min Search

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

Mode	WiMAX OFDMA

Remote Command	`:CALCulate:EVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	:CALC:EVM:MARK:MIN
Key Path	**Peak Search**

Marker To

There is no 'Marker To' functionality supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

Key Path	**Marker**

Marker Function

There are no 'Marker Functions' supported in Mod Analysis so this front-panel key will display a blank softkey when pressed.

Key Path	**Marker**

SCPI Only Parameters

Number of Bursts (Query Only)

This query returns the number of bursts to be measured. In the auto-detect mode, this parameter changes when detection is performed correctly. In the predefined-mode, this parameter is calculated from the map file.

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:BURSt:NUMBer?`
Example	:CALC:EVM:BURS:NUMBer?
State Saved	No

Selected Burst Number

Allows you to select which burst's info is returned by MEASure|READ|FETCh:EVM10?

Mode	WiMAX OFDMA
Remote Command	`:CALCulate:EVM:INFormation:BURSt <integer>` `:CALCulate:EVM:INFormation:BURSt?`
Example	:CALC:EVM:INF:BURS 2 :CALC:EVM:INF:BURS?
Dependencies/Couplings	Max value of this parameter depends on Number of Bursts
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	:CALC:EVM:BURS:COUN?

13 Power Stat CCDF

Many of the digitally modulated signals now look noise-like in the time and frequency domain. This means that statistical measurements of the signals can be a useful characterization. Power Complementary Cumulative Distribution Function (CCDF) curves characterize the higher level power statistics of a digitally modulated signal. The curves can be useful in determining design parameters for digital communications systems.

The power statistics CCDF measurement can be affected by many factors. For example, modulation filtering, modulation format, combining the multiple signals at different frequencies, number of active codes, and correlation between symbols on different codes with spread spectrum systems will all affect measurement results. These factors are all related to modulation and signal parameters. External factors such as signal compression and expansion by nonlinear components, group delay distortion from filtering, and power control within the observation interval also affect the measurement.

The power measured in power statistics CCDF curves is actually instantaneous envelope power defined by the equation:

P = (I + Q) / Zo

(Where I & Q are the quadrature voltage components of the waveform and Zo is the characteristic impedance).

A CCDF curve is defined by how much time the waveform spends at or above a given power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For capturing a lower probability down to 0.0001%, this measurement is made in the single mode by pressing Single. To make the power statistics CCDF measurement, the instrument uses digital signal processing (DSP) to sample the input signal in the channel bandwidth. The Gaussian distribution line as the band-limited Gaussian noise CCDF reference line, the user-definable reference trace, and the currently measured trace can be displayed on a semi-log graph. If the currently measured trace is above the user reference trace, it means that the higher peak power levels against the average power are included in the input signal.

Key Path	**Meas**

Remote Command Results

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:PSTat commands for more measurement related commands.

`:CONFigure:PSTatistic`

`:INITiate:PSTatistic`

`:FETCh:PSTatistic[n]?`

`:READ:PSTatastic[n]?`

`:MEASure:PSTatastic[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,
not specified or 1	Returns 10 scalar results: 1. Average input power (in dBm) 2. Probability at the average input power level (in %) 3. Power level that has 10% of the power 4. Power level that has 1% of the power 5. Power level that has 0.1% of the power 6. Power level that has 0.01% of the power 7. Power level that has 0.001% of the power 8. Power level that has 0.0001% of the power 9. Peak power (in dB) 10.Count
2	Returns a series of 5001 floating the current measured power stat trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0.0 dB power 2. Probability at 0.01 dB power 3. Probability at 0.02 dB power . . . 1. Probability at 49.9 dB power 2. Probability at 50.0 dB power
3	Returns a series of 5001 floating point numbers (in percent) that represent the Gaussian trace. This is the probability at particular power levels (average power), in the following order: 1. Probability at 0.0 dB power 2. Probability at 0.01 dB power 3. Probability at 0.02 dB power . . . 1. Probability at 49.9 dB power 2. Probability at 50.0 dB power

4 Returns a series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. This is the probability at particular power levels (average power), in the following order:

1. Probability at 0.0 dB power

2. Probability at 0.01 dB power

3. Probability at 0.02 dB power

. . .

1. Probability at 49.9 dB power

2. Probability at 50.0 dB power

Measurement Results and Views

The Power Stat CCDF measurement consists of single view. This is common for both Uplink (MS) and Downlink (BTS). There are two windows, Metrics (left) and graph display (right).

Graph window

Marker Operation	Yes
Corresponding Trace	Yellow: Series of 5001 floating the current measured power stat trace. (n=2) Initially all markers refer this trace. Light Blue: Series of 5001 floating point numbers (in percent) that represent the Gaussian trace. (n=3) Violet: series of 5001 floating point numbers (in percent) that represent the user-definable reference trace. (n=4) The Gaussian and Reference trace/line can be removed using the features under the Trace/Detector key

Metrics window

Name	Corresponding Results	Explanation

Average Power [dBm]	n=1 1st Average input power	99.99 dBm
Average Power [%]	n=1 2nd Probability at the average input power level	99.99 %
10.0% [dB]	n=1 3rd Power level that has 10% of the power	99.99 dB
1.0% [dB]	n=1 4th Power level that has 1% of the power	99.99 dB
0.1% [dB]	n=1 5th Power level that has 0.1% of the power	99.99 dB
0.01% [dB]	n=1 6th Power level that has 0.01% of the power	99.99 dB
0.001% [dB]	n=1 7th Power level that has 0.001% of the power	99.99 dB
0.0001% [dB]	n=1 8th Power level that has 0.0001% of the power	99.99 dB
Peak [dB]	n=1 9th Peak power	99.99 dB
Peak[dBm]	This is not available using remote commands.	99.99 dBm

Span X Scale

The SPAN X Scale key accesses the menu to set the desired horizontal scale.

Key Path	**Front-panel key**

Scale/Div

Enables you to enter a time value to change the horizontal scale.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PSTatistic:VIEW[1]:WINDow2:TRACe:X[:SCALe]:PDIVision ?`
Example	DISPl:PST:VIEW:WIND2:TRAC:X:PDIV 10 DISPl:PST:VIEW:WIND2:TRAC:X:PDIV?
Restriction and Notes	CCDF measurement has the trace display only at Window 2.
Preset	2.00
State Saved	Saved in instrument state.
Min	0.1
Max	20
Key Path	**Span X Scale**

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. The parameter values are measurement independent except all Attenuation values, and the Internal Preamp selection that are the same across all measurements.

Key Path	**Front-panel key**

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings. This key has read-back text that describes the total attenuator value.

See AMPTD Y Scale, Attenuation in the "Analyzer Setup Functions" section for more information.

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**

View/Display

Accesses a menu of functions that enable you to control the instrument display as well as turn the bar graph On and Off.

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 will remain 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.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:DISPlay:PSTatistic:ANNotation:TITLe:DATA <string>`
	`:DISPlay:PSTatistic:ANNotation:TITLe:DATA?`
Example	DISP:PST:ANN:TITL:DATA “Power Stat CCDF”
	DISP:PST:ANN:TITL:DATA?
Preset	Power Stat CCDF
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Key Path	**View/Display, Display, Title**

Trace/Detector

Accesses a menu of functions that enable you to control the storage and manipulation of the reference trace, as well as controls the display of the trace data.

Key Path	**Front-panel key**

Store Ref Trace

Copies the currently measured curve as the user-definable reference trace. The captured data will remain until the other mode is chosen. Pressing this key also refreshes the reference trace.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:STORe:REFerence`
Example	CALC:PST:STOR:REF
Key Path	**Trace/Detector**

Ref Trace

Toggles the reference trace display between On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:RTRace[:STATe] OFF|ON|0|1` `[:SENSe]:PSTatistic:RTRace[:STATe]?`
Example	PST:RTR OFF PST:RTR?
Preset	OFF
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

Gaussian Line

Toggles the Gaussian trace display between On and Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:GAUSsian[:STATe] OFF|ON|0|1` `[:SENSe]:PSTatistic:GAUSsian[:STATe]?`

Example	PST:GAUS OFF PST:GAUS?
Preset	ON
State Saved	Saved in instrument state.
Range	On | Off
Key Path	**Trace/Detector**

BW

Opens the BW menu, which contains keys to control the information bandwidth functions of the instrument.

Key Path	**Front-panel key**

Info BW

Sets the measurement bandwidth according to the channel bandwidth for the current measurement.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:BANDwidth <freq>` `[:SENSe]:PSTatistic:BANDwidth?`
Example	PST:BAND 8 MHz PST:BAND?
Dependencies/Couplings	WiMAX OFDMA: The default value depends on the Radio Standard selection.
Preset	SA, WCDMA, C2K: 5 MHz WiMAX OFDMA: 25 MHz
State Saved	Saved in instrument state.
Min	10.0 kHz
Max	Hardware Dependent: No Option = 8 MHz Option B25 = 25 MHz
Key Path	**BW**

Sweep/Control

Enables you to pause the power statistics CCDF measurement after the current data acquisition is complete. When Paused, the label on the menu key changes to Resume. Press the Resume key to resume the measurement where it was when it was paused.

Key Path	**Front-panel key**

Pause/Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Press the Resume key to resume the measurement where it was when it was paused.

Key Path	**Sweep/Control**

Meas Setup

Accesses the functions that allow you to change the settings for your measurement requirements.

Key Path	**Front-panel key**

Counts

Sets the accumulated number of sampling points for data acquisition. The range is 1.000 kpt (k point) to 2.00000 Gpt (G point) with 1 kpt resolution. Counts couples to Meas Cycles. When the value for counts is changed, the Meas Cycles value will be (Counts / SamplingFrequency * MeasInterval).

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:COUNts <integer>` `[:SENSe]:PSTatistic:COUNts?`
Example	PST:COUN 5001 PST:COUN?
Dependencies/Couplings	This value is coupled to Meas Cycles. When Counts is changed, the MeasCycles value will be (Counts / SamplingFrequency * MeasInterval).
Preset	10000000
State Saved	Saved in instrument state.
Min	1000
Max	2000000000
Key Path	**Meas Setup**

Meas Cycles

Set the number of measurement cycles to calculate power statistic data. This number couples to Counts. The Counts value is (MeasCycles * Sampling Frequency * MeasInterval).

When the counts value cannot be divided by (Sampling Frequency * MeasInterval), this value is displayed as a decimal fraction.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:SWEep:CYCLes <integer>` `[:SENSe]:PSTatistic:SWEep:CYCLes?`

Example	PST:SWE:CYCL 1001 PST;SWE:CYCL?
Dependencies/Couplings	The Counts value will be (MeasCycles * Sampling Frequency * MeasInterval).
Preset	Depends on the sampling frequency.
Min	1
Max	Depends on the sampling frequency.
Key Path	**Meas Setup**

Meas Interval

Sets the number of data points to be used as the measurement interval. This value couples to Counts. The Counts value is (MeasCycles * Sampling Frequency * MeasInterval).

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:SWEep:TIME <time>` `[:SENSe]:PSTatistic:SWEep:TIME?`
Example	PST:SWE:TIME 2 ms PST:SWE:TIME?
Dependencies/Couplings	The Counts value will be (MeasCycles * Sampling Frequency * MeasInterval). WiMAX OFDMA: The default value depends on Radio Device status.
Preset	1.0 ms
Min	100.0 us
Max	10.0 ms
Key Path	**Meas Setup**

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**

IF Gain Auto

Activates the Auto Rules for IF Gain When Auto is active, the IF Gain is set to High Gain under any of the following conditions:

the input attenuator is set to 0 dB

the preamp is turned On

the Max Mixer Level is 20 dBm or lower

For other settings, Auto sets the IF Gain to Off.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:PSTatistic:IF:GAIN:AUTO[:STATe]?`
Example	PST:IF:GAIN:AUTO ON PST:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation is active (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed using the following rule. The Auto selection sets IF Gain On under any of the following conditions: the preamp is turned on, the input attenuator is set to 0 dB, or the Max Mixer Level is 20 dBm or lower. For other settings, Auto sets IF Gain to Off.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto | Man
Key Path	**Meas Setup, IF Gain**

IF Gain State

Selects the range of IF gain. On sets the high gain option, which allows for better noise level measurements and Off sets low gain when measuring large signals.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`[:SENSe]:PSTatistic:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:PSTatistic:IF:GAIN[:STATe]?`
Example	PST:IF:GAIN ON PST:IF:GAIN?
Remote Command Notes	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, IF Gain**

Meas Preset

Restores all measurement settings to their default values.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CONFigure:PSTatistic`
Example	CONF:PST
Dependencies/Couplings	Selecting Meas Preset will restore all measurement parameters to their default values.
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode.
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	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:TRIGger:PSTatistic[:SEQuence]:SOURce EXTernal[1]|EXTernal2|FRAMe|IMMediate|LINE|RFBurst` `:TRIGger:PSTatistic[:SEQuence]:SOURce?`
Example	TRIG:PST:SOUR LINE TRIG:PST:SOUR?
Remote Command Notes	You must be in the Spectrum Analysis mode, W-CDMA mode, cdma2000 mode or WiMAX OFDMA mode to use this command. Use :INSTrument:SELect to set the mode. The enums of VIDeo and IF point the same trigger source (video trigger).
Preset	SA, WCDMA, C2K: IMMediate WiMAX OFDMA: RFBurst
State Saved	Saved in instrument state.
Range	Free Run | Line | External 1 | External 2 | RF Burst (Wideband) | Periodic Timer
Key Path	**Front-panel key**

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.

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**

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**.

If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The Active function for the selected marker's current control mode is the default active function. If the current control mode is Off, there is no active function and the active function is turned off. The active function display is the marker X axis value entered in the active function area will display the marker value to its full entered precision.

All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:PST:MARK:MODE POS CALC:PST: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	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

Sets the marker X Axis value in the current marker X Axis Scale unit. This function has no effect if the control mode is **Off**, but is the remote command equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <rel_ampl>` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:PST:MARK3:X <rel_ampl> CALC:PST: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. 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.
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	0.0
Max	50.0

Marker Y Axis Value

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:PST:MARK11:Y?
Restriction and Notes	The query returns the marker Y-axis result, if the control mode is **Normal**, or **Delta**. If the marker is **Off** the response is not a number.
Preset	0
State Saved	No

Properties

Accesses the marker properties menu.

Key Path	**Marker**

Relative To

Sets the reference marker that the selected marker will be relative to.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:PST:MARK:REF 3 CALC:PST: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 will be returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Key Path	**Marker, Properties**

Trace

Assigns the specified marker to the designated trace. The trace choices are: Measured, Gaussian, or Reference.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe MEASured|GAUSsian|REFerence` `:CALCulate:PSTatistic:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:PST:MARK3:TRAC MEAS CALC:PST:MARK:TRACE?
Preset	MEASured
State Saved	Saved in instrument state.
Range	Meassured | Gaussian | Reference
Key Path	**Marker**

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).

Key Path	**Marker**

All Markers Off

Turns off all markers.

Mode	SA, WCDMA, C2K, WiMAX OFDMA
Remote Command	`:CALCulate:PSTatistic:MARKer:AOFF`
Example	CALC:PST:MARK:AOFF
Key Path	**Marker**

Peak Search

There is no 'Peak Search' functionality supported in Power Stat CCDF. The front-panel key will display a blank menu when pressed.

Key Path	**Front-panel key**

Marker To

There is no 'Marker To' functionality supported in Power Stat CCDF. The front-panel key will display a blank menu when pressed.

Key Path	**Front-panel key**

Marker Function

There are no 'Marker Function' supported in Power Stat CCDF. The front-panel key will display a blank menu when pressed.

Key Path	**Front-panel key**

14 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`

`:INITiate:MONitor`

`:FETCh:MONitor[n]?`

`:READ:MONitor[n]?`

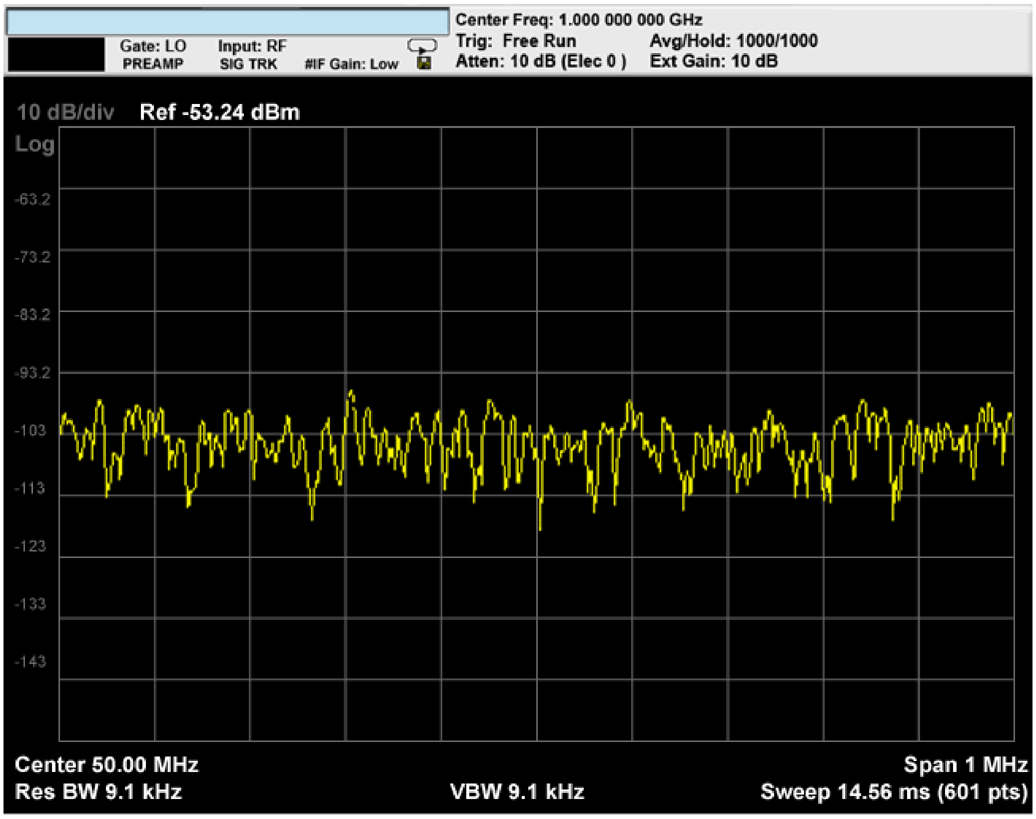
`:MEASure:MONitor[n]?`

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	:SPEC:MON:SPAN 1 MHz
Dependencies/Couplings	Changing the span causes the resolution bandwidth to change automatically, and will affect data acquisition time.
Preset	WCDMA: 10.0 MHz
	WiMAX OFDMA: 50.0 MHz
	PN: 1.0 MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent:
	Option 503 = 3.6 GHz
	Option 508 = 8.4 GHz
	Option 513 = 13.6 GHz
	Option 526 = 26.5 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 will remain unchanged.

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:PREVious`
Example	:MON:FREQ:SPAN:PREV
Dependencies/Couplings	Selecting last span will change 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 dB :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, Attenuation**

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 will remain 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**

Trace Type

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**

Select Trace

Determines which trace the type control keys will affect. You can select one of three traces.

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**

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.

- Sample-the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.

- 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 Rose-n-fell 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.
- 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|RMS` `[: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.
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**

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/Detectore**

Clear All Trace

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:RES 2.4 MHz :MON:BAND? :MON:BAND:AUTO ON :MON:BAND:AUTO?
Preset	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	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	BAND:VID:RAT 2 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	FREQ:SPAN:BAND:RAT 200 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**

RBW Control (Filter Type)

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

Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:MONitor:BANDwidth:SHAPe?`
Example	:MON:BAND:SHAP GAUS :MON:BAND:SHAP?
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	GAUSsian|FLATtop
Key Path	**BW, RBW Control, Filter Type**

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 Number

Specifies the number of measurement averages used when calculating the measurement result. The average is displayed at the end of each sweep.

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 will be 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 LINE :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	**Front-panel key**

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/Resume

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**

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 will default 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

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 NORM
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.
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 <freq> :CALC:MON: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.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37

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: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**. 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 will return 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**

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?
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 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 l 3 l 4 l 5 l 6 l 7 l 8 l 9 l 10 l 11 l 12 l 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 will display 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 will display 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 Fctn**

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 Fctn**

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 Fctn**

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 Fctn**

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 Fctn**

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 Fctn**

15 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	**Meas**

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`

`: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.

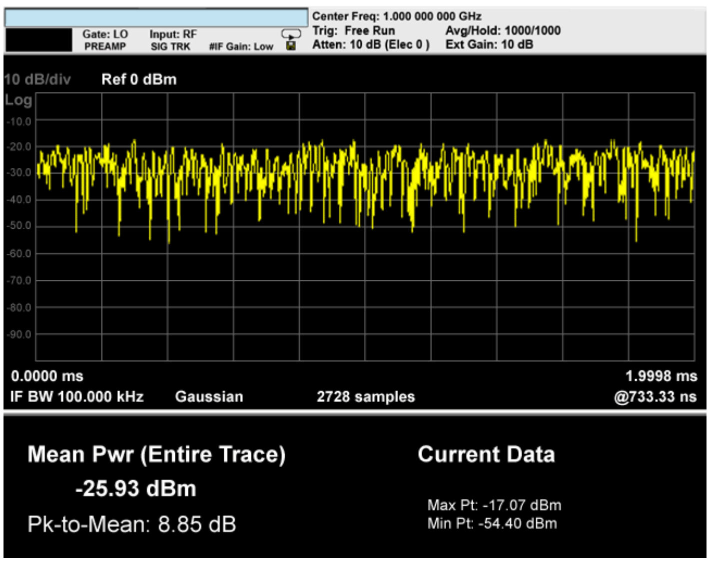
1	Returns the following scalar results: Sample Time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc.). Mean Power is the mean power (in dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled. 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 either the power across the entire trace, or the power between markers if the markers are enabled. 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, and so forth.). 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

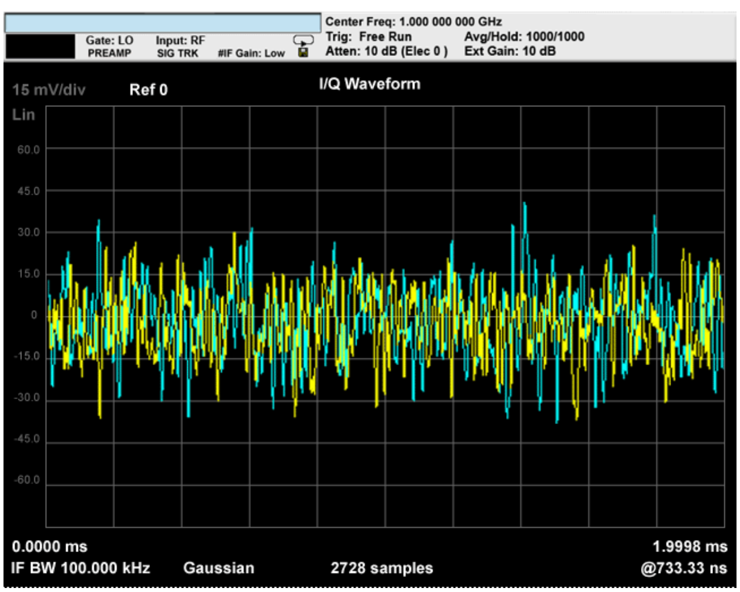
The following information describes the Waveform measurement results.

Graphic Results View

This view shows an example of the RF Envelope result for the waveform (time domain) measurements in the graph window. The measured values for the mean power and peak-to-mean power are shown in the text window.



This 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
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

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
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
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
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
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

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
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
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

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
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	**Front-panel key**

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 will remain 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
Remote Command	`:DISPlay:WAVeform:ANNotation:TITLe:DATA <string>`
	`:DISPlay:WAVeform:ANNotation:TITLe:DATA?`
Example	DISP:WAV:ANN:TITL:DATA “Agilent”
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
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
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 will display 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
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	100 kHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: No Option = 10 MHz Option B25 = 25 MHz
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
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, Filter Type**

Meas Setup

Displays the setup menu keys that enables 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 will be 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

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 will be displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WiMAX OFDMA
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
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
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
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.

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
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
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
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
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
Remote Command	`TRIGger:WAVeform:SOURce EXTernal[1]|EXTernal2|FRAMe|IF|VIDeo|IMMediate|LINE|RF Burst` `TRIGger:WAVeform:SOURce?`
Example	TRIG:WAV:SOUR LINE TRIG:WAV:SOUR?
Restriction and Notes	IF in SCPI selection is the same as VIDeo. IF is kept because of BWCC
Remote Command Notes	The keywords of VIDeo and IF point the same trigger source (video trigger). You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	IMMediate
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 Resume un-pauses the measurement.

See Sweep/Control in the "Analyzer Setup Functions" section for more information.

Key Path	**Sweep/Control, Pause/Resume**

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**

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. Note that 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
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. 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	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

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
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:MARK7:X 50 ms CALC:WAV: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. 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 will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37

Marker X Axis Position

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
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:MARK3:X:POS 500 CALC:WAV: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**. 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 will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37

Marker Y Axis Value

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WiMAX OFDMA
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:WAVeform: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

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Mode	BASIC, PN, WCDMA, C2K, 1XEVDO, GSM, WiMAX OFDMA
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:MARK6:REF 8 CALC:WAVeform: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 will be returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the 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
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:MARK6:TRAC RFEN CALC:WAVeform:MARK:TRACE?
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
Remote Command	`:CALCulate:WAVeform:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:WAVeform:MARKer:COUPle[:STATe]?`
Example	CALC:WAV:MARK:COUP ON CALC:WAVeform: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
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
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
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 will display 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 Fctn 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**

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
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:WAVeform:MARK:FUNC BPOW CALC:WAV:MARK10: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 Fctn**

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 Fctn**

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
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:MARK12:FUNC:BAND:SPAN 20 ms CALC:WAV:MARK3: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 Fctn**

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
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:WAVeform: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 Fctn**

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
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:LEFT 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 Fctn**